VALUE ENGINEERING GUIDANCE HANDBOOK

UNITED STATES

DEPARTMENT OF THE INTERIOR

No. VE-1

VALUE ENGINEERING GUIDANCE HANDBOOK

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VALUE ENGINEERING PROGRAM

The Department of the Interior is committed to assuring that the American public obtains the best value for the funds expended, and the constructed facilities and items of procurement are of the highest quality. This can be achieved through the effective application of Value Engineering. Value Engineering is a management technique using a systematic approach for problem identification and solving.

Value Engineering/Analysis is critical to saving scarce Federal dollars and, at the same time, provides better value. Spreading out the Federal investment dollar, building more for less money, increasing efficiency, and reducing dependency on energy-intensive buildings and facilities are some of the benefits of implementing a Value Engineering program.

Any comments, questions, and/or concerns regarding this guidance handbook or the Department of the Interior - Value Engineering Program should be directed to the Director, Office of Construction Management, 1849 C Street, N.W., Washington, D.C. 20240; (202) 208-3403.

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SECTION A - Value Engineering Program

VE Program Management; General Information; Description of Value Engineering and Benefits; VE Study Methodology

VALUE ENGINEERING GUIDANCE HANDBOOK

Section A - Management; General Information; Description of VE and Benefits; Study Methodology

1. Purpose.

a. This manual explains principles and methodology of value engineering and proposes methods of applying them to satisfy the policy, objectives, and goals established by the Department of the Interior.

b. Value engineering intends to promote innovation and creativity develop alternatives, achieve personal development and reduce costs of government. Guidance is structured to minimize prescribed methods in meeting goals.

c. Value engineering can provide more beneficial use of Department of the Interior limited resources and reduce the cost of a project while maintaining necessary or even achieving superior performance. Although VE effort is directed at reducing cost, equal consideration is given to maintaining or improving quality, maintainability, performance, safety, and reliability.

2. References.

a. Department of Interior Departmental Manual (DM) Value Engineering, Part 369 (369 DM 1)
b. Office of Management and Budget (OMB) Circular No. A-131, January 26, 1988
c. Federal Acquisition Regulation (FAR) Title 48, Part 48 (Value Engineering) and value engineering clauses in Part 52
d. DOI Acquisition Regulation (DIAR) Part 48, Value Engineering

3. General. This handbook does not supersede regulations nor override authority or responsibility of management. Portions of this handbook may be reproduced as separate documents for use by any office within the Department of the Interior.

4. A Description of Value Engineering.

a. Description. Value engineering is not a critical review, constructability review, or cost-cutting exercise. It is a problem-solving technique that bypasses learned responses to produce alternative solutions at less cost. It follows a job plan and problem identification format that promotes objectivity and creativity. When the VE methodology is followed precisely, good results are assured.

b. Goal. A value engineering team must be willing to challenge criteria and opinions, many of which are maintained by historical continuity and not by repeated assessments of their validity. Value engineering follows a methodology of six distinct phases and relies upon teamwork and the creativity of a multi-disciplined group. It searches for current technology to achieve the value engineering goal: To creatively furnish technically sound alternatives to satisfy the user's needs at the lowest life cycle cost.

c. Initial Steps. Value engineering examines systems or designs and breaks them into components which are then described in terms of intended use. The intended use (the purpose for the component's existence) is described in just two words, an active verb and a measurable noun, called a function.

d. Isolating Study Items. Functions are arranged into two-word pictures describing the project under study. The result is a FAST diagram, an acronym for Function Analysis System Technique. The FAST diagram technique verifies the correctness of the function definitions and shows their relationships. It identifies higher order, basic, and secondary functions. (More information on FAST diagram in VE Job Plan - Phase I, Information) A cost model of functions prioritizes opportunities for savings. A cost/worth analysis pinpoints poor value in greater detail. When project cost exceeds worth it should be identified by the VE team as a candidate for study/analysis. Poor worth functions are studied in the order of their impact on project or program costs.

e. Developing Answers. Alternatives are generated through brainstorming each poor value function. Ideas are put through two

sieves, a criteria/idea matrix followed by an advantages/disadvantages analysis. The top (3 and up to 6, depending on how closely ranked) alternatives surviving these procedures are identified. The top ranking alternative is developed for the recommended solution and estimates prepared. Redesign costs and hours are estimated to display implementation impacts. Savings are calculated using instant and/or life cycle costs, whichever is applicable, and subtracting redesign costs to show net cost reduction. The second and third alternatives are roughed out within available time and money to furnish multiple-choice solutions. Management should receive 3 sound answers to every major problem for flexibility in decision making. Multiple answers increase implementation.

f. Presentation. Results are presented to the user, client, and designer and fully discussed until a meeting of minds is reached. A report is prepared for additional review and record. Implemented recommendations and resulting savings are reported through channels to the authority responsible for the overall VE program.

5. Team Member Benefits. What are the benefits to the people and the organization in the process of conducting VE studies?

a. There is a challenge to complete a task within a brief time frame. The pace of business as usual is exchanged for a sense of urgency and fast-tracking efforts and actions.

b. They are isolated from the usual office environment and administration, to promote creative thinking and new approaches and alternatives to problem solving.

c. They are given temporary responsibility and authority to examine a concept from its mission to its components with the intent to effect change.

d. They develop new interpersonal relationships with new input in a new environment which they structure. They get experience by interacting with people from different departments and interests.

e. The team presents the package of its efforts to top management. It accepts total responsibility for the production of solutions and defends its procedures and rationale.

f. There is increased communication of ideas, thoughts, and concerns between the team and management. The VE team presents VE study findings and recommendations to top management.

6. Management Benefits

a. The Value Engineering process and team study requires participatory decision making, direct communication both vertically and horizontally, and the ability of people to furnish answers to major problems quickly.

b. Top management need only determine the general areas of high impact on the organization and select teams which have qualifications to match the magnitude of the impact. The responsibilities for identifying the critical problems and developing and distilling sound, cost-reducing alternatives lie with the team. This not only brings many more people into the decision-making process, but also reduces the stress on management.

c. Value studies isolate the problems, search and reduce the plethora of information and technology to germane facts, and provide management with at least three workable solutions to each problem. Management gets to choose courses of action from its overview rather than accept or reject the usual single solution to each problem.

7. Organization Benefits

a. Funds travel farther. Cost/benefit ratios of projects constructed with VE study will in the vast majority of cases be more favorable. The parallel efforts of value teams serve as effective audits on the efficiencies in your organization.

b. People serving on teams gain appreciation for problems and concerns of other divisions and a more comprehensive understanding of the organization is maintained.

c. Communications improve in relation to the number of teams utilized and the continual change in the people composing the teams. The participation of top management in attending VE study presentations is a significant benefit. The more people talk, the less assumptions and misunderstandings will add to problems.

d. The cross training derived from value team activities will boost morale, and keep employees better informed.

e. The organization will become better prepared to develop quick response to major problems. The ability of the organization to meet emergencies and respond to change will improve. Confidence in both management and employees will be expressed in trust. A trust that a team will respond to challenge effectively and that management will accept and implement from the solutions provided.

f. Your entire organization is a pool of potential consultants. Value engineering assembles them with a match of talents and problems to provide the best answers in the shortest time. The value engineering/analysis/management approach to problem solving can be used as an effective management system.

8. VE Study Methodology

a. Study Costs and Team Selection. Investment in performing a VE study is proportional to the complexity, size and composition of the study subject, the quality of design or operation, level of development, time allotted for completion, and similar factors.

b. Team Composition. Team composition is dependent upon study subject content and advanced planning. The original project designers are never part of the VE study team.

c. Team Leader. A team leader is the most critical element in producing successful studies. The leader must know VE principles and methodology, be technically comfortable in the areas of study, and be skilled in planning and directing activities.

d. Team Size. Team size will vary. There will be a core group, supplemented by part-time participants. The team leader must estimate the skills needed and for how long.

e. Leader Activities. A team leader must assure that function analysis, FAST diagrams, function-oriented cost models are prepared, and assemble an information package for team members prior to the study. The team leader must also evaluate each day's progress, plan the next day's activities and prepare portions of the report each day. The final rough draft of the report should be completed within one day of the study's end.

f. Continuity of Study. Team members should be dedicated to the study without interruption. Teams are much more effective when continuous effort is allowed.

g. Team Effectiveness. Teams become more efficient when they are familiar with the VE process, forms, and format. Create the largest VE trained pool of team members possible. A site visit by the team leader and key team members is very productive. Video recordings and minutes of briefings are valuable for the entire VE team. Rough-cut efforts of function analyses and FAST diagrams are used for team briefing the first day of the study and modified with team input.

VALUE ENGINEERING STUDY METHODOLOGY

Value Engineering/Analysis Job Plan. A VE study must follow VE methodology precisely, using an Six Step Job Plan:

1. Information gathering
2. Speculation
3. Evaluate alternatives
4. Develop top alternatives
5. Presentation of study
6. Implementation

Two additional "steps" of a Value Engineering study include a Project Selection step before the study(s) are initiated and an Audit process should be carried out after a study is completed to fully document and track implementation of VE recommendations.

1. Phase I - Selection. Identification of candidate projects or parts of very large projects for Value Engineering/Analysis study is the objective of this phase. Value Engineering/Analysis is best applied in the early stages of project design, however, it can also be very effective in the project planning stage. A VE study of the entire project concept has proven to be highly effective.

DOI Departmental Manual Instructions (369 DM 1), Value Engineering/Analysis, provides specific requirements for VE study consideration of all construction, repair, rehabilitation, and renovation projects greater than $ 500,000 in estimated project costs. Projects between $ 500,000 and $ 1,000,000 may be excluded from VE analysis if it is determined that estimated VE savings do not economically justify study and redesign costs. All projects over $1,000,000 are required to be subjected to VE study.

Within very large projects, Relative Cost Ranking is one technique used in identifying elements of a project for study. The relative cost ranking method is used to identify the most costly parts/elements of a given project. As a general rule, 80 percent of the project costs occur in 20 percent of the project parts, "the 80-20 Rule".

In the relative cost ranking method, the parts of a project are ranked from highest to lowest in terms of total costs. Generally, potential value improvement is greatest on those parts of the project with the highest total costs. Cost estimates should be sufficiently accurate to permit the relative ranking of the costs of each project part.

The following categories are provided as examples of projects and project components that usually offer significant VE study consideration:

- Over One-Half Million dollars
- Major potential resource impacts
- Great complexity in the design. Generally, the more complex the design, the more opportunity there is to improve value and performance.
- Projects incorporating advancement in the state-of-the-art.
- High degree of time compression in the design cycle. A project having an accelerated design program will usually contain elements of over-design.
- A component or material that is critical, exotic, hard-to-get or expensive.
- Intricate shapes, deep excavations, high embankments, steep slopes, etc.
- Overly long material haul; excessive borrow/waste.
- Excessive reinforcement.
- Architectural embellishment.
- Record seeking design (longest span, highest piers, etc.)
- Specifically designed components which appear to be similar to low-cost off-the-shelf items.
- Components which include non-standard fasteners, bearings, grades, sizes, angles, etc.
- Sole-source materials or equipment.
- Processes or components which require highly skilled or time consuming labor.
- Items with poor service or cost history.
- Items with high maintenance and field operation problems.
- Project costs that exceed the amount budgeted.
- Standard plans in use more than 5 years.

- Existing needs to solve problems or improve conditions other than cost, such as:

noise	reliability	aesthetics
safety	fire protection	simplification
maintainability	standardization	air quality
time	performance	operation
quality	weight	maintenance
energy use	water quality	

- Projects with varying degrees of repetition - first of several lodging units, housing, dormitories, classrooms, garages, etc.

2. Phase II - Information gathering. The objective of the information (investigation) phase of the job plan is to acquire knowledge of the project to be studied and to assess major functions, cost, and relative worth. The critical requirements of the information phase are (1) determining the basic and secondary functions of the items in the design, and (2) relating these functions to cost worth.

Before the basic and secondary functions can be defined, all relevant information and data relative to the project should be gathered. Information gathering may be subdivided into separate tasks and assigned to individual team members. Various types of data to be obtained may include physical data, methods data (how it is operated, constructed, installed, maintained, etc.), performance data (present/actual vs. desired, maintenance, safety, utility, etc.), potential resource impacts, restrictions, cost data, and quantity data (volume or repetition).

Information must be obtained from credible sources. Various sources from which the required information might be obtained may include the following:

People sources - project managers, the design team, operators, maintenance staff, architects, contractors, fabricators, suppliers, consultants.

Data sources - planning documents, drawings, design specifications, program of requirements, computations, design analysis and calculations, material lists, cost estimates, schedules, scopes of work, handbooks, engineering and maintenance manuals, industry and government standards and codes, test and maintenance reports, user feedback, catalogs, technical publications, previous study data files, management information systems, conference and symposium proceedings.

NOTE: It is important that the names, addresses,and telephone numbers of persons contacted during the course of the study be recorded and keyed to the information supplied.

Cost data - To make a complete analysis of any project, the total cost of the items, the cost of each component and a breakout of the cost of each design component are needed. Accurate and itemized cost estimates should be obtained, if possible. It is essential to have all relevant information concerning the technologies involved. The more factual information brought to bear on the problem the more likely the possibility of a substantial cost reduction.

Determining and Defining Functions

The functions should be stated in terms that accurately define the problem and at the same time are broad enough to generate the greatest number of alternative solutions. Functions are those performance characteristics which an item possesses. A design normally has both basic and secondary functions. The basic function is the primary purpose of design. Secondary functions are not required for their own sake - they only augment the basic function. If the design is changed, the need for the secondary functions may be modified or even eliminated.

The function of any item or design must be defined literally by two words: a verb and a noun. For example, the basic function of a chair or

bench is to "support weight" - support is the verb and weight the noun. The function of a pencil is "make marks"; A screwdriver's basic function would be "transfer torque" for turning screws or "apply leverage" to pry open a can lid. A clear understanding of the user's needs is necessary to develop an accurate definition of the basic function.

- The use of two words helps to avoid combining different functions and ensures that only one function will be defined at one time.

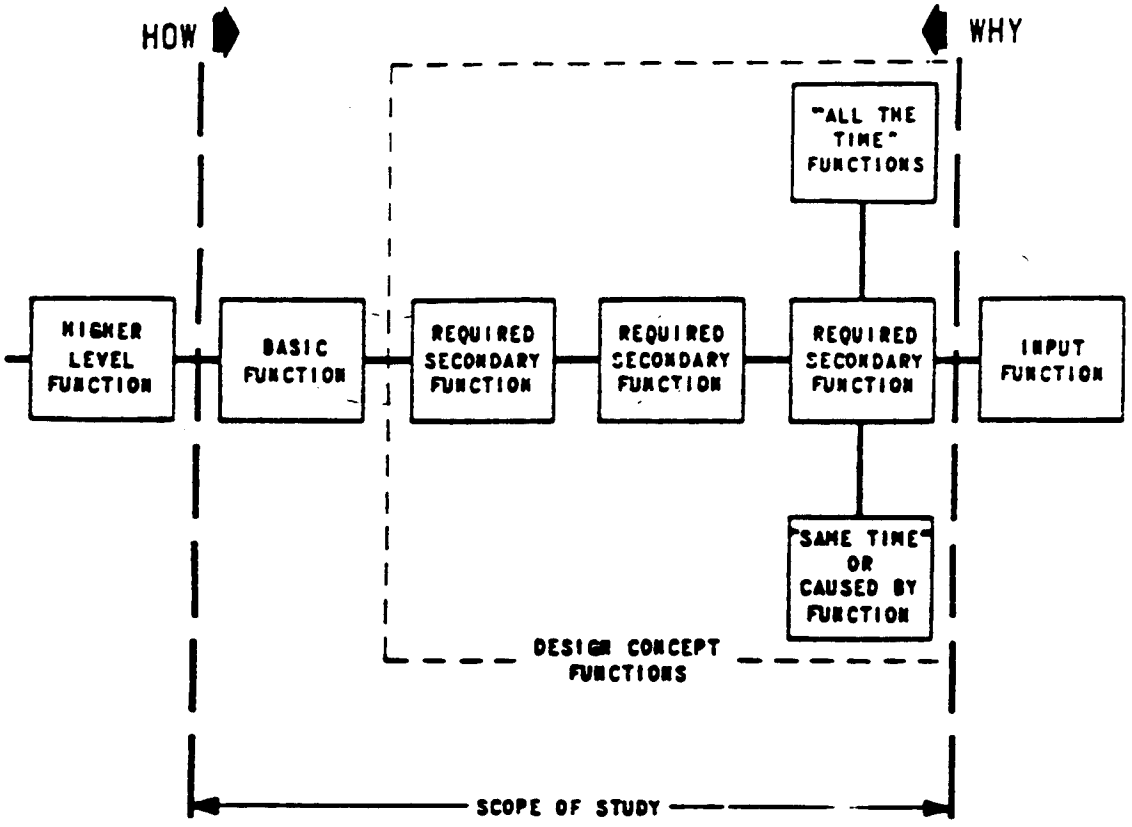
- The use of two words facilitates the task of distinguishing between primary and secondary functions because it helps to identify each function as specifically as possible.

The basic function answers the question, "What must it do?" A secondary function answers the question, "What else does it do?" For example, the basic function of exterior paint is "protect surface"; the secondary function is "improve appearance". Secondary functions support the basic function but generally exist only because of the particular design approach that has been taken to perform the basic function.

FAST Diagram

The Functional Analysis System Technique (FAST) diagram is developed in the Informational Phase, and uses the original design as a model. The development of the FAST diagram is best accomplished as a team effort.

The FAST diagram provides a clear understanding and identification of the most general function, or basic function, to be studied. The FAST diagram is developed to the right, asking the question, HOW is function (verb)(noun) to be accomplished. The progression to the right proceeds by continuing to ask "How" for each new function on the diagram. The answer to the "How" questions is verified by asking the question "Why" is it necessary to (verb)(noun) ? By asking the "Why" questions, one should progress to the left to increasingly higher order functions. Asking the questions "Why" can also extend the diagram to the left, thereby illustrating that the starting function may not have been the basic or primary function as initially assumed.



Fundamentals of FAST Diagraming

The line of functions from right to left is the critical path - the functions that are critical to the performance to the basic function. All other functions are supporting functions, these supporting functions are positioned vertically in the FAST diagram.

Determining Functional Worth

The final step in the information phase is to determine the functional worth of each function, i.e., the cost of the function in relation to the method or design that will perform the function under consideration. Functional analysis or function-cost-worth approach displays the costs of functions which helps identify high cost functions and areas of poor value. Worth is the lowest known cost to satisfactorily achieve the function. Functions costing more than they are worth should be identified for additional study. The size of the money involved and the cost/worth ratio will determine the priority of studies. Study the higher ratio of the larger sums first, working toward the smaller cost functions later.

INFORMATION PHASE CHECK LIST

General

- o Identify both the required and desired functions.
- o Identify basic and secondary functions.
- o Have all functions been listed ?
- o What must it do or accomplish ?
- o Are the functional requirements well understood ?
- o Relationship(s) to other systems, units, or components ?

Specifications

- o Review specifications and requirements.
- o Do specifications reflect actual desired results ?
- o Are the specifications required, or guidelines ?
- o Are the specifications realistic ?
- o Can specification requirements be modified or eliminated ?
- o Will any modification to the specifications simplify design and/or construction ?
- o Are all performance and environmental requirements necessary and/or sufficient ?
- o Have the specifications been interpreted correctly by the planner and the designer ?
- o Have the applicable State and Federal policies, procedures, and regulations been reviewed and complied with ?

Planning and Design

- o Collect available background information.
- o How were project requirements determined ?
- o Does the design do more than is required ?
- o What alternatives were considered during design and why were they not incorporated into the proposed design ?
- o How long is the design life under normal use ?
- o What are the Life Cycle costs ?

Methods and Processes

- o Can functions be combined, simplified, or eliminated ?
- o Are any non-functional or appearance-only items required ?
- o How is construction performed and under what criteria ?
- o What is schedule ?
- o Identify any high direct labor costs.

Materials and Procurement

- o Are special, hard-to-get, or costly materials specified ?
- o What alternative materials were considered and why rejected ?
- o Are the materials proposed hazardous or require special handling ?
- o Are any on the proposed materials sole source items ?

Maintenance

- o Past performance data on proposed materials/items ?
- o What normal maintenance is expected and frequency ?
- o Any escalating maintenance requirements with age ?
- o Cost of maintenance needs to be identified ?

Function and Worth

- o Are costs assigned to each function ?
- o Has a worth been established for each function ?
- o Are functional requirements exceeded ?
- o Any unnecessary features proposed in design ?
- o Is there a better way to perform the function ?
- o Can any function be eliminated ?
- o Can the entire project be eliminated, can function continue to be provided with out project ?
- o Identify all high and unnecessary cost areas and high cost/worth ratio areas.
- o Does the potential cost reduction (net savings) appear to be sufficient to make further Value Engineering/Analysis investigation and proposal development worthwhile ?

3. Phase III - Speculation. The objective of this phase is to determine what alternative ways can the necessary function be performed. A number of alternatives for each basic function(s) of high cost design elements, with high cost-worth ratio, are generated through brainstorming.

Brainstorming - This phase is designed to introduce new ideas to perform the basic function. A brainstorming session is a problem-solving conference wherein each participant's thinking is stimulated by others in the group. During the session the group endeavors to generate the maximum number of ideas. No idea is criticized and all ideas are recorded. Judicial and negative thinking is not permitted.

Speculation Phase Check List

- Has an atmosphere been provided that encourages and welcomes new ideas ?
- Have all members of the team participated ?
- Have all the ideas been recorded ?
- Has the team reached for a large quantity of ideas ?
- Have the ideas been generated without the constraints of specifications and system requirements ?
- A separate speculation phase work sheet should be filled out for each basic function description.
- For group brainstorming, have the ground rules of: no criticism of ideas, "free wheeling" encouraged, desire for large number of ideas, and combining and improving ideas clearly explained ?
- Have provisions been made for a later follow-up session to evaluate and refine ideas ?
- Has the present way the basic function is accomplished been dismissed from everyone's thoughts ?
- Have all of the basic functions of the project been subjected to the complete speculation phase ?

4. Phase IV - Evaluation. In this phase, sometimes called the analysis and investigation phase, the team examines the alternatives generated in the preceding phases. The principal tasks are to evaluate, refine, and cost analyze the ideas and to list feasible alternatives.

a. Select Feasible Alternatives - Alternatives developed in the speculation phase are now subjected to an initial feasibility analysis. The study team develops a list of potential alternatives, which may be singular alternatives or expanded alternatives through combining or refining ideas developed during the speculation phase. During this phase the ideas must be refined to meet the necessary project criteria, environmental, and operating conditions of the particular situation. Ideas which obviously do not meet these requirements are dropped. The remaining ideas are potentially workable and are cost analyzed. Those showing worthwhile savings are then listed along with potential advantages and disadvantages. Ideas whose advantages outweigh the disadvantages and which indicate the greatest cost savings are selected for further evaluation.

b. Develop and rank criteria specific to the project - Criteria can be both generic and unique to the project to be constructed. Generally, criteria that is applied to most projects will include some or all of the following criteria:

- o performs the function
- o low first cost
- o cost/ease of maintenance
- o environmental or aesthetic impacts
- o reliability
- o low operating cost
- o simple of construct or assemble

After the criteria are identified for a project, the criteria must be ranked or rated. Each of the criteria are rated against all other criteria to determine the relative importance of each of the criteria to the specific project under consideration. Note that the criteria "performs the function" is not really a criteria because it is always a number one requirement of any alternative, and must equal or exceed the relative weight of the highest desired criteria.

c. Evaluate alternatives against the criteria - An evaluation of each alternative against the established and weighted criteria for the project is the next step. An analysis matrix form is utilized to assist in completing this step.

The potential alternatives are listed on the form and each alternative is graded from 1-Poor to 5-Excellent in performance of function and against each of the weighted criteria. Alternatives that do not rank 4 (Very Good) or 5 (Excellent) in "Performance of Function" should be dropped from further consideration. It is recommended that each criteria be rated against all alternatives before moving to the next criteria. This insures consistent rating, and results in a fair assessment of each criteria against the alternatives.

When the evaluation is completed for each alterative and the final ranking of alternatives is determined, select at least the top three ranked alternatives to undergo the next evaluation phase step. If the points apart for more than three ideas, carry the tightly-bunched group ahead for the advantages/disadvantages evaluation.

d. Compare advantages and disadvantages - After the alternatives are ranked and weighted against the criteria, a comparison of advantages and disadvantages is made. The alternatives may have advantages and disadvantages that are not addressed in the desired criteria. The determination of total costs of an alternative is very important. One alternative might offer lower acquisition cost, but at the same time result in higher cost for the life of the system. That is, the initial cost might be lower, but the overall cost to the user could be higher because of increased operational or maintenance costs. VE considers the total costs involved.

The cost estimates at this stage are preliminary and based on best information available without developing lengthy calculations. The cost estimates are for the purpose of determining relative advantage and disadvantage. Detailed initial cost of alternatives and total capital and life-cycle costs are fully developed in the next phase when the best alternative is thoroughly analyzed.

CRITERIA	RAW SCORE	RANKING OF CRITERIA
A. RELIABILITY	10	
B. LOW FIRST COST	12	
C. LOW O&M COST	4	
D. LOW REPLACEMENT COST	2	
E. MEET POTENTIAL FUTURE STANDARDS	0	
F. ENVIRON. & AESTHETICALLY DESIRABLE	13	
G. LOW OPERATIONAL COMPLEXITY	14	
H.		

How Important

4–Major preference
3–Medium preference
2–Minor preference
1–Letter/Letter–No preference, each scored one point

	B	C	D	E	F	G	H
A	A4	A4	A4	A4	A1/F1	A2	
B		B3	B4	B4	F2	B1/G1	
C			C2	C2	F3	G3	
D				D2	F3	G4	
E					F4	G4	
F						G2	
G							

NOTE: DROP CRITERIA WITH A RAW SCORE OF 2 OR LESS

Criteria Weighting Process

Evaluation Phase Check List

- o Has each idea/alternative been refined to see how it could be made to meet all needed functional and physical requirements ?
- o Have all ideas been reviewed ?
- o Can alternatives be simplified to attain further performance/cost optimization ?
- o Have evaluation criteria been established ?
- o Do evaluation criteria appropriately address cultural, resource, aesthetic, and environmental values ?
- o Do evaluation criteria consider operations, maintenance, costs of construction, and life-cycle costs ?
- o Has each alternative/idea been rated according to relative merits regarding cost and other advantages and/or disadvantages ?
- o Have all the functions been re-evaluated as to their need ?
- o Have at least three ideas been selected as the best alternative ideas/proposals ?

5. Phase V - Development. The Development Phase of the Value Engineering job plan is to thoroughly analyze the best alternatives selected during the evaluation phase. Additional data and information is collected, project and life-cycle cost estimates are prepared, and change proposals are developed, where applicable, in order to determine feasibility of implementation.

The VE study team must use all available sources of information to determine if the alternative they select is truly less costly, and performs the required functions without impairing the essential quality, reliability, or maintainability.

Each alternative must be subjected to: (a) careful analysis to insure that the user's needs are satisfied; (b) a determination of technical adequacy; and (c) the preparation of estimates of construction costs, cost of implementation and design changes, schedule changes, and life-cycle costs.

Those alternatives that stand up under close technical scrutiny should be followed through to the development of specific designs and recommendations. Recommended design changes, materials, procedures, changes to standards and policy, costs, and implementation requirements are documented. Prepare sketches or drawings of alternative solutions to facilitate identifying problem areas in the design and to facilitate detailed cost analysis.

Anticipate problems related to implementation and propose specific solutions to each. Develop a specific recommended course of action for each proposal that details the steps required to implement the idea, especially if proposed changes impact areas such as: inspection, environmental, legal, procurement, materials, planning, and Tribal consultation.

VE Study Team Responsibilities - Individual team members are assigned tasks in their field of expertise. Additional help is brought in as needed. Telephone calls are made and recorded. The best alternative is developed, estimated, and compared to the original concept to determine cost differences. Alternates 2 and 3 are completed to the degree time allows; ideally, they should be as complete as number 1. Life cycle cost estimates are made. Sketches are prepared and converted to vu-graphs for use in presentation. Forms showing before and after VE concepts are completed. Hours and costs for redesign are estimated for each proposal. A summary of proposals and costs is prepared by the team.

LIFE-CYCLE COST ANALYSIS
Using Present Worth Costs

Item: GOGA 308
Life-Cycle Period: 25 Years
Date: 9-27-90 Interest Rate: 10%

		ORIGINAL		ALTERNATE NO. 1		ALTERNATE NO. 2	
		Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth
COLLATERAL / INITIAL COSTS	Base Cost						
	Interface Costs						
	a. Construction	800,000	800,000		800,000		175,000
	b.						
	c.						
	Other Initial Costs						
	a. Design		45,000		70,000		70,000
	b.						
	Total Initial Cost Impact (IC)						
SALVAGE & REPLACEMENT COSTS	Single Expenditures @ 10% Interest						
	1. Year 10 PW Factor Replacement					175,000	67,375
	2. Year 20 PW Factor Replacement					175,000	25,900
	3. Year ____ PW Factor ____						
	4. Year ____ PW Factor ____						
	5. Year ____ PW Factor ____						
	Salvage ____ PW Factor ____						
	Total Present Worth						
ANNUAL COSTS	Annual Costs @ 10% Interest						
	a. Maintenance						
	Escal. Rate____ PWA Factor ____						
	b. Operations						
	Escal. Rate____ PWA Factor 9.077					124,350	1,128,724
	c. Others						
	Escal. Rate____ PWA Factor ____						
	d. Others						
	Escal. Rate____ PWA Factor ____						
	Total Annual Costs						
	Total Present Worth Costs *		845,000		870,000		1,467,000
	Life Cycle (PW) Savings						

PW - Present Worth PWA - Present Worth of Annuity

Development Phase Check List

- Has an estimate of Life-Cycle costs been made ?
- Do alternatives selected satisfy the user's needs ?
- Are all supporting data and information available ?
- Are the operational requirements met ?
- Are the maintenance requirements met ?
- Have the best ideas/alternatives been thoroughly described ?
- Have the ideas been solicited and recorded from specialists ?
- Have all available solutions been considered ?
- Have locally available materials been considered ?
- Have the quantities and costs used in calculations been double-checked ?
- Have the estimated net cost savings been determined ?
- Has a "first choice" been selected ?
- Are there other alternatives to propose ?
- Does the proposal present all the facts clearly, concisely, and convincingly ?
- Have the alternatives been examined for environmental impacts ?
- Have appropriate organization and outside specialists been consulted ?
- Have all other applicable organization functions been made a part of the team and/or consulted ?
- Has the time and cost required to redesign and incorporate recommended changes been determined ?
- Has it been determined when the change can reasonably be incorporated ?
- Does the alternative design make use of available standards and materials ?
- Have all the best reference materials been consulted ?

6. Phase VI - Presentation. The success of an individual VE study is measured by the savings achieved from implemented study recommendations. Regardless of the merits of the proposal, the net benefit is zero if the recommendations are not implemented. The initial presentation of the recommendations must be concise, factual, accurate, and presented in such a manner as to create a desire on the part of those responsible to implement the change.

A value engineering proposal is a challenge to the "status quo" of any organization. It is a recommendation for beneficial change.

Ideally, the VE study report is sent to the VE Review Board and affected parties. However, in many cases the decision makers in the various Interior Bureaus and Offices will not be organized into a formal VE Review Board. It is important that the VE study recommendations are fully developed and forwarded to the appropriate decision making body in the organization as expeditiously as possible. If the VE study recommendations are to be incorporated into any project redesign requirements, they must be made available quickly and must have full support of upper management.

a. VE Study Recommendations - The VE study report should always be made in writing. Oral presentation of study recommendations should supplement the written report. The VE study report should: 1) summarize the study, 2) detail each VE recommendation, with supporting cost estimates of VE savings for each recommendation, 3) identify expected advantages and disadvantages, 4) provide an implementation plan of action, 5) be proactive, "sell" the ideas of change.

The information contained in the VE study report will determine whether it will be accepted or rejected. Management must base its judgement on the documentation submitted with the report, and supporting documentation should provide all of the data the reviewer will need to reach a decision. The VE study report should attempt to satisfy questions the decision-maker is likely to ask, and permit the decision-maker to preserve his/her professional integrity and authority. Prompt implementation of VE recommendations is dependent upon the

expeditious approval by the individuals responsible for a decision in each organizational component affected by the approval.

Value Engineering Workbook - Compile a comprehensive workbook throughout the life of a project VE study, starting with the Investigation Phase. If diligently compiled during the study, the workbook should require minimal preparation during the presentation phase. The VE workbook should be a complete and ready document to facilitate preparation of the summary report and support the team's recommendations.

The following list provides, at a minimum, the information that should be recorded in the project workbook for each project.

1. Identification of the project.
2. A brief summary of the project/problem.
3. An explanation of why this project was selected for study.
4. A functional evaluation of the process or procedure under study.
5. All information gathered by the group relative to the item under study.
6. A complete list of all the alternatives considered.
7. An explanation of all logical alternatives investigated and reasons why they were not developed further.
8. Technical data supporting the ideas(s) selected, with other factual information to justify selection of the most favorable alternative(s).
9. Original costs, cost of implementing the alternatives being proposed, and cost data supporting all savings being claimed.
10. Operational and maintenance effects.
11. Acknowledgement of contributions made by others to the study.
12. Steps to be taken and the timetable for implementation of recommendations proposed.
13. Before and after sketches of the items under study.

If the study is done by contract, the presentation is given on the last day to save costs of reassembling the VE team. The team leader and team members present the recommendations to a review board, user, design firm, and all affected parties. The list of attendees and the minutes of the presentation are included in the final VE Study Report. If it is a contract study, only rough draft materials are given to the attendees, such as FAST diagrams, cost models, and the Executive Summary. Telephone numbers of the team are included for contacts to clarify issues. This phase is critical and requires careful preparation and rehearsal to ensure a professional effort.

Presentation Phase Check List

- Is the need for a change clearly shown and justified ?
- Is the proposal concise ?
- Are all the pertinent facts included ?
- Are dollar savings included ?
- Is the VE Study Summary Report complete and accurate ?
- Have the recommendations, costs, and savings been double-checked ?
- Has back-up material for questions which may be asked been prepared ?
- Could a vu-graph, projector, flip charts, and/or blackboard help present (sell) your recommendations ?
- Has a plan of action been established which addresses implementation of the recommendation(s) ?
- Are there pictures or sketches of before-and-after conditions ?
- Has the best alternative been fully documented ?
- Have all the constraints been considered ?
- Has the recommendations been presented to the most appropriate responsible manager or decision-maker ?
- Have the recommendations been extended to all areas of possible application ?
- Has credit been given to all participants ?
- If you were the decision-maker, is there enough information for you to make a decision ?

7. Phase VII - Implementation. An Implementation Plan is part of the VE report. It must describe what must be done by whom and by what time and for how much cost, to modify the existing concept. Decision-makers need to know the full impact of acceptance, including costs, risks and benefits. When they are given 3 technically sound alternatives to each major function, confidence in the original concept dwindles and implementation rates rise. The VE team must exercise empathy when preparing the Implementation Plan, and recognize the potential risk of those being asked to implement recommendations.

It is imperative that the approved VE recommendations are rapidly and properly translated into action, to achieve the savings and/or project improvements that were proposed. Successful implementation depends on placement of the necessary actions into the normal routine of business. Progress should be reviewed periodically to insure that any roadblocks which arise are overcome promptly.

Expediting Implementation. For in-house studies, the fastest way to achieve implementation of a recommendation is to effectively utilize the knowledge gained by those who originated it. Whenever possible, the VE study team should be required to prepare initial drafts of documents necessary to revise the specifications, handbooks, change orders, drawings, contract requirements, etc. Such drafts will help to assure proper translation of the recommendation into action, and will serve as a baseline from which to monitor progress.

Implementation Phase Check List

- Are the expected results known ?
- Has someone been designated as responsible for taking action to implement the approved recommendations ?
- Has the contract(s), Statements-of-work, etc. been amended ?
- Have the specifications or drawings been revised ?
- Have completion dates for implementation been established ?
- Have the resources needed to accomplish implementation been recommended and allocated ?

8. Phase VIII - Audit. The objective of an audit requirement is to determine if the desired results have been attained, properly documented, and reported. The audit or monitoring of VE study recommendation implementation is essential to the continuing success of the organization's Value Engineering program. Accuracy in tracking and compiling the VE cost savings is paramount, as well as the need to assure implementation of approved VE recommendations has occurred.

The audit responsibilities for each VE study undertaken are critical to managing a comprehensive and effective VE program. An approved VE recommendation should not be permitted to die because of inaction in the implementation phase. Implementation of approved recommendations should be monitored to insure that implementation is 100 percent.

The audit also serves to accurately document the VE savings directly to the recommendations implemented. Information regarding the implemented recommendations should be distributed to all interested parties. A record of the VE implemented recommendations and the corresponding original design should be kept to be utilized as future reference and documentation for other VE studies and project design alternatives.

NOTE: The following chart was developed by the National Park Service, Division of Value Engineering and Technical Assistance, Denver Service Center.

VALUE ANALYSIS CONDENSED JOB PLAN

PHASE	OBJECTIVE	KEY QUESTIONS	TECHNIQUES	TASKS
SELECTION	SELECT PROJECT	WHAT IS TO BE STUDIED? WHO IS BEST ABLE TO STUDY THE PROBLEM? WHAT MUST BE KNOWN TO START THE STUDY?	SOLICIT PROJECT IDEAS. SPECULATE ON SOURCES OF PROJECTS. IDENTIFY HIGH COST/LOW VALUE AREAS. PLAN THE PROJECT. OBTAIN AUTHORIZATION TO PROCEED. ALLOCATE RESOURCES.	DEVELOP PLAN TO IDENTIFY PROJECT. ANALYZE PROJECTS FOR APPLYING V.E. EVALUATE PROJECTS FOR POTENTIAL. PRESENT PROJECTS TO MANAGEMENT. SELECT PROJECTS FOR V.E. STUDY. IMPLEMENT STUDY PLAN.
INFORMATION	INVESTIGATE PROJECT	WHAT IS THE PROJECT? WHAT ARE USER'S NEEDS? WHAT IS THE COST? WHAT IS THE WORTH? WHAT IS NOW ACCOMPLISHED? WHAT MUST BE ACCOMPLISHED?	GET INFORMATION FROM THE BEST SOURCES. GET ALL THE FACTS. WORK WITH SPECIFICS. GET ALL AVAILABLE COSTS. CHALLENGE EVERYTHING. IDENTIFY THE FUNCTIONS.	GATHER THE 10-238, THE TASK DIRECTIVE, THE DESIGN ANALYSIS, PLANS, SPECIFICATIONS, PROJECT REVIEW COMMENTS, USER'S CRITERIA, PROJECT CONSTRAINTS. INTERVIEW PLANNERS & DESIGNERS FAMILIAR WITH THE PROJECT.
	ANALYZE FUNCTION AND COST/WORTH	WHAT ARE HIGHER ORDER AND BASIC FUNCTIONS? WHAT IS THE BASIC FUNCTION WORTH? WHAT ARE THE SECONDARY FUNCTIONS WORTH? WHAT ARE THE HIGH COST AREAS? CAN ANY FUNCTION BE ELIMINATED? WHICH FUNCTIONS HAVE POOR VALUE? WHICH FUNCTIONS NEED STUDY?	EVALUATE BY COMPARISON. PUT $ ON SPECS AND REQUIREMENTS. PUT $ ON KEY TOLERANCES AND FINISHES. PUT $ ON KEY STANDARDS.	BREAK PROJECT INTO INDIVIDUAL COMPONENTS. ASSIGN FUNCTIONS TO EACH COMPONENT. PREPARE FAST DIAGRAMS. ANALYZE COST/WORTH. SELECT STUDY AREAS BASED ON FAST AND COST/WORTH AND MAGNITUDE OF COST.
SPECULATION	SPECULATE ON ALTERNATIVES	WHY IS IT BEING DONE? IS IT NEEDED? WHAT ELSE WILL PERFORM THE FUNCTION? WHERE ELSE, MAY THE FUNCTION BE PERFORMED? HOW ELSE MAY [illegible]UNCTION BE PERFORMED?	LIST EVERYTHING. BE IMAGINATIVE, CONTRIBUTE FREELY. USE CREATIVE TECHNIQUES. DEFER JUDGEMENT. DO NOT CRITICIZE ANY IDEA. BE COURAGEOUS. DEVELOP A LARGE NUMBER OF IDEAS.	CREATE A TEAM ENVIRONMENT. SELECT TECHNIQUES TO BE USED. SPECULATE ON ALTERNATIVES. SPECULATE ON PARAMETERS.
EVALUATION	EVALUATE ALTERNATIVES	HOW MIGHT EACH IDEA WORK? WHAT WILL BE THE COST? WILL EACH IDEA PERFORM THE BASIC FUNCTION? WHAT IS THE BEST ALTERNATIVE? ARE YOUR EVALUATION CRITERIA APPROPRIATE?	WEIGH ALTERNATIVES. CHOOSE EVALUATION CRITERIA. REFINE IDEAS. PUT $ ON EACH MAIN IDEA, ACCURATELY. EVALUATE BY COMPARISON.	USE TOTAL TEAM INPUT. CONSULT WITH SPECIALISTS. SPECULATE ON EVALUATION CRITERIA & COMPARE. EVALUATE ALTERNATIVES. SELECT BEST ALTERNATIVES.
DEVELOPMENT	DEVELOP ALTERNATIVES	HOW WILL THE NEW IDEA WORK? HOW CAN DISADVANTAGES BE OVERCOME? WHAT WILL BE THE TOTAL COST? WHAT ARE O&M NEEDS? WHY IS THE NEW WAY BETTER? WILL IT MEET ALL REQUIREMENTS? WHAT ARE THE LIFE-CYCLE COSTS? WAS NEW TECHNOLOGY CONSIDERED?	USE SEARCH TECHNIQUES. GET INFORMATION FROM THE BEST SOURCES SPECIALISTS AND SUPPLIERS. CONSIDER SPECIALTY MATERIALS, PRODUCTS AND PROCESSES. CONSIDER STANDARDS. USE NEW INFORMATION. WORK WITH SPECIFICS. GATHER CONVINCING FACTS. PREPARE A DESIGN.	SPLIT CHORES AMONG TEAM MEMBERS. SPECULATE ON INFORMATION NEEDED. SPECULATE ON INFORMATION SOURCES. DEVELOP A PLAN OF INVESTIGATION. DEVELOP SELECTED ALTERNATIVES. SELECT PREFERRED ALTERNATIVE. DEVELOP IMPLEMENTATION PLAN. COMPILE ALL COSTS. PREPARE A DESIGN.
PRESENTATION	PRESENT ALTERNATIVE	WHO MUST BE SOLD? HOW SHOULD THIS IDEA BE PRESENTED? BACKUP AVAILABLE? WHAT WAS THE PROBLEM? HAVE YOU ANTICIPATED ROAD BLOCKS? WHAT ARE THE BENEFITS? RISKS? SAVINGS? WHAT IS NEEDED TO IMPLEMENT THE PROPOSAL?	MAKE RECOMMENDATIONS. USE SELLING TECHNIQUES. BE FACTUAL. BE BRIEF. GIVE CREDIT.	DEVELOP A WRITTEN PROPOSAL. SPECULATE ON POSSIBLE ROAD BLOCKS TO ACCEPTANCE AND DEVELOP RESPONSES. PRESENT RECOMMENDED ALTERNATIVE. PREPARE VISUAL AIDS. PROVIDE AN IMPLEMENTATION PLAN.
IMPLEMENTATION	IMPLEMENT ALTERNATIVES	WHO IS TO IMPLEMENT THE CHANGE? HOW WILL THE PLANS OR CONTRACT BE AMENDED? HAVE NEEDED RESOURCES BEEN ALLOCATED?	TRANSLATE PLAN INTO ACTION. OVERCOME PROBLEMS. EXPEDITE ACTION. MONITOR PROJECT.	DEVELOP A TIME SCHEDULE. DEVELOP CHANGE DOCUMENTS. IMPLEMENT APPROVED ALTERNATIVE. EVALUATE PROGRESS.
AUDIT	AUDIT RESULTS	DID THE NEW WAY WORK? HOW MUCH DID IT COST? HOW MUCH MONEY WAS SAVED? DID THE CHANGE MEET EXPECTATIONS? WHO IS TO RECEIVE RECOGNITION?	VERIFY ACCOMPLISHMENTS. MAKE AWARDS. REPORT TO MANAGEMENT.	AUDIT RESULTS OF IMPLEMENTATION. EVALUATE PROJECT RESULTS. PRESENT PROJECT RESULTS. PRESENT AWARDS.

SECTION B - Elements of a Value Engineering Program

Value Engineering Program Coordinator; Training; Conducting In-house Value Engineering Studies; Plan of Action

SECTION B - The Elements of a VE Program; Duties, Responsibilities and Procedures; Plan of Action

1. The Value Engineering Program Coordinator (VEPC)

a. Definition. The VEPC will require an individual that has knowledge and understanding of the orgainization; has the ability to gain cooperation; has understanding of the elements that need to fit together; has ability to work with a variety of disciplines; must be organized, creative and self-motivated and technically competent in the field of not only value engineering, but also in the mission technology of the Bureau/Office in which located.

b. Qualifications. Ideally, the VEPC should be a Certified Value Specialist (CVS) currently certified by the Society of American Value Engineers (SAVE). The VEPC should be an engineer or architect, preferably a licensed professional, with a construction/design-oriented background as well as management training and experience if coordinating a program for construction or operations and maintenance work. If the program consists of administration, the VEPC should be a professional in the management field.

c. Authority.

(1) VEPC Location. Authority follows the flow of the organization chart for DOI, whether it deals with accounting, design or contractor relationships. If the position is buried in the organization, it will be ineffective and the VE program will be mediocre. The VEPC should be a full-time position answering directly to the head of the element establishing the program or high/upper managment.

(2) VEPC Support. It has been demonstrated in other agency VE programs that a full-time VEPC produces approximately two-and-one-half times the savings of a part-time VEPC. Clerical help is mandatory and an assistant VEPC should be added as the program matures and expands. The VEPC should be given the responsibility and

authority to run the program in behalf of the head of the DOI element charged with the goals.

d. Responsibilities. If the VEPC is given the responsibility and authority for the VE program, the following duties should be placed on the position:

(1) Establish and maintain an active and productive VE program meeting the requirements and goals of current regulations, policies, and goals of the Department.

(2) Establish and maintain a training program in coordination with OCM-VEPM, that creates a reservoir of people knowledgeable in the principles and applications of VE in proportion to the demand for VE activities in both the experience and expertise needed. Assure that training workshops are certified by the Society of American Value Engineers (SAVE).

(3) Coordinate and assemble a VE Review Board of program managers/decision-makers having the authority and sufficient level to hear VE proposals and determine implementation, modification or rejection actions. The VE Review Board members may vary depending on the project under study and organizational components affected by the VE proposals.

(4) Coordinate and assemble Plans of Action developed within the organization with VE studies required to meet goals. Recommend team members, schedules, study locations, levels of effort, presentation schedules, and monitor the implementation.

(5) Coordinate VE studies performed by Architect-Engineer firms. Serve as a consultant in the selection of A-E firms to do VE work. Examine A-E activities and reports to ensure that VE principles and methodology are used. Ensure that all VE studies follow VE methodology as outlined in this Handbook, including the eight-step job plan, function analysis, FAST diagramming, function-oriented cost modeling, systematic analysis of alternatives, report preparation and oral

presentation to the VE Review Board, user, client, designer, and other affected parties.

(6) Promote the use of contractor VE activities with those elements within the organization charged with contractual relations and administration. Ensure letters and brochures of encouragement and explanation of the VE clause are issued with every contract using the clause. Ensure fast and fair considerations for all Value Engineering Change Proposal submittals.

(7) Prepare internal reports to measure program effectiveness. Inform authorities of program successes and deficiencies on a regular, informal basis. Recommend actions and acknowledgements to promote and praise VE activities. Recommend a recogition system and award amounts to be paid for outstanding VE activities.

(8) Ensure that a cohesive, consistent and organization-wide VE effort is carried on. Serve as the VE consultant for every facet of the program. Distribute information obtained from studies in formats provided in this Handbook; and provide information in usable form to Bureau/Office heads.

2. Training.

a. Coordinators and Staff.

(1) Training. The VEPC and assistants must have completed a 40-hour VE training workshop approved by the certification board of the Society of American Value Engineers prior to beginning their duties. In addition, they should complete/receive refresher courses every five years.

(2) Professional Registration. The VEPC and assistants should be encouraged to attain the Associate Value Specialist (AVS) status within two years of appointment and the Certified Value Specialist

(CVS) within four years of appointment. Management must realize that SAVE recommends the majority of the VEPC's time be spent on VE activities in order to qualify toward CVS certification. Part-time VE work can be tenuous in justification.

b. In-House Personnel.

(1) Type of Training. Training must address the level of interest and responsibility for implementing a VE program. Executive level personnel should receive 2-hour seminars, which should describe the VE program's role in the organization's mission; mid-management personnel should receive 4-hour seminars describing the role of VE as a management tool to achieve both personnel and technical goals; those mid-managers and supervisors that wish to know the workings of VE should be given an 8-hour VE seminar which transitions from the 4-hour to the working level seminar. All VE team members should attend a 40-hour VE training workshop; however, if time or budget precludes that, they should have an 8-hour seminar that condenses the 40-hour materials to that time.

(2) Level of Training. Training should be emphasized at the beginning of a VE program to spread the technique, usage and program acceptance quickly. Maintenance training must then be done on a regular basis to indoctrinate turnover recruits and refresh existing staff in up to date VE developments and techniques. If VE studies are performed by a contractor, the Agency's project manager should be a team member; this will serve to provide continued training and reinforce VE prinicples and methodologies.

c. Outside Personnel. Organization interests are well-served to invite representatives from A-E firms and contractor organizations to attend the 40-hour VE training workshops. Space must be limited; however, interest in the program by those firms doing work with the organization is quickly generated. The mix of perspectives in examining study items is very worthwhile.

3. In-house Value Engineering.

a. Selecting Projects for Study.

(1) Plan of Action. The Plan of Action (prepared in cooperation with responsible officials) should list and prioritize specific projects or programs for VE study. Since meeting the goals should be a critical element in the performance appraisal Bureau/Office officials, prioritizing the studies is important. The VEPC should consolidate the Plan of Action in consultation with the project originators/managers/designers and advise on any adjustments that appear more effective.

(2) General Sources. Seek out and solicit possible projects/studies from line managers. An excellent source of suggested topics for study can be obtained from estimators who are trained in VE principles. They are the first and last to attach money to concepts and contracts. They identify poor value areas, complex construction, tolerances that are too restrictive or loose, materials that are scarce or difficult to work with, and similar observations.

b. Selecting and Using the Team.

(1) Qualities of Members. An ideal team size is five people. It can be supplemented with as many additional team members as needed. Team selection is a critical element in the success of any effort. Attitudes and personal traits are as important as technical expertise. Search out technically competent people who listen to others, actively contribute, support ideas and build on them, who have positive attitudes and who understand and apply the principles of value engineering.

(2) Skills and Time. When you have selected the item/project for study, determine what skills are required to address the components forming the item. Skills and times for study will vary, depending on the percentage of total costs for each component and its associated skill. Select team members based upon qualifications, not only

degrees and licenses; proportion their time for study based upon the complexity and value of their specialty area; estimate the time for the total study on the longest periods required for the main disciplines; and include all support and services for a complete study package. For example, if the study item is a $10,200,000 research laboratory complex, with site work and three small buildings part of the project. A hypothetical team may look like this:

Discipline	Time	Support	Time
Team Leader	84-hours	Lab Equipment Specialist	8-hours
Architect	55-hours	Landscape Architect	8-hours
Civil	36-hours	Traffic Engineer	2-hours
Electrical	40-hours	Materials Engineer	8-hours
Mechanical	50-hours	HVAC Specialist	16-hours
Structural	50-hours	Estimator	24-hours
		Word Processor	24-hours
		Report Preparation	16-hours

This study will require eight 10-hour plus days for the team leader and five 10-hour plus days for the VE team. The team leader must perform preparatory and follow-up work to make best use of the team's time. The VEPC can expect to oversee the team leader's work and extend the leader's time if needed.

(3) Efficient Use of Team. Ration team members' times to avoid having them sit around when not needed. The full team is needed for brainstorming and evaluation to ensure the broad range of input a team provides. Report writing and preparation occurs during the study, but is often not completed until five working days after the presentation.

(4) Study Tasks. The VE Job Plan and detail steps in performing the VE study are described in Section A.

c. Leading the Team. The VEPC and VE staff should lead selected studies to accumulate points for certification and recertification. However, it is essential to use other team leaders for most studies with

the VEPC serving as a consultant. Some of the objectives of the VE program are to help employees achieve more of their potential, develop expertise in the process, identify leadership talent, and display it during the presentation phase, and give the team as much independence as possible during the effort.

d. Implementation of Study Recommendations.

(1) Review Board. A Value Engineering Review Board with decision-making authority for the Bureau/Office containing the VE program must be established to act on all VE study recommendations or established on an ad hoc basis for each VE study. "The Buck Stops Here" philosophy must be exercised to speed decision making.

(2) Who to Include. Those exercising authority for decisions which established the original concept must be given the opportunity to evaluate the proposed VE alternatives. They should be one of the evaluation inputs in the overall decision making process.

(3) Inclusion of Others. The Review Board may invite representatives with a vested interest in the item under study to the presentation. They should receive the VE study a week ahead to generate genuine concerns. The intent of the presentation is to exchange ideas and concerns and come to a meeting of the minds.

(4) Pitfalls. The presentation must be a professional event by the team; one which presents facts, advantages and disadvantages, risks, and rewards, and recommendations that are honest and straightforward. Various attempts may be made by organizational components and others to maintain the status quo. The Review Board must be aware that comments will be forwarded that object to any change or revision.

(5) Decision. The Review Board should carefully listen to all give and take, and reach concensus on accepting or rejecting all or part of the recommendations immediately. The VEPC should facilitate the Review Board actions and see that complete minutes are made of the presentation, consideration, and decision process. They should be included in the final VE report. This process accustoms people to

proactive decision making and gives management a tool to bypass the normal way of getting answers in emergencies.

(6) Implementation Strategies. Implementation is a most critical phase of the VE job plan. All the money, time, and dedication invested in and by the team is lost unless implementation occurs. People are typically more comfortable with a concept or system they have lived with for a considerable time than an alternative which is presented from a specially created study team. The most successful way to disarm this natural bias is to unsettle the confidence in the present concept or method. VE teams should present three technically sound alternatives to the existing one. When decision-makers see multiple methods of satisfying the function they are more likely to accept a new concept or method. They will be more open to change. Implementation plans must explain what actions are required, who has to perform them by what time, how much time and money is involved, how schedules are affected, and what the benefits are in savings and what the improved project design features are.

(7) Human Relations. Maintaining good human relations is essential for the VE program. People of all levels in an organization are involved in the total VE effort. For the VE program to be successful, the organization must be a part of the dynamic and creative spirit that is basic to VE. VE is often critical of the status quo and seeks to make constructive changes. Change is sometimes viewed as a threat to the security of the established way of doing things. The VE team must deal with a wide variety of resistance to change in a flexible and honest manner and should attempt to identify and anticipate possible kinds of resistance to change. A change recommended to save money gives an indication that the old way is uneconomical or is representative of poor value. Build trust that consideration of people and their careers is important in the VE philosophy.

e. Records and Reporting.

(1) General. Keep records of all VE program activities so audits will be easy and favorable and reporting will be complete and quick. File regulations and information germane to the program. List the objectives, goals, and responsibilities in individual categories and sub-categories and file actions within them that are fully, yet concisely, documented.

(2) Forms. The Department of the Interior Annual VE reporting forms will be developed by the Value Engineering Program Manager (VEPM) in the Office of the Secretary, Office of Construction Management. They will be modified only by that office. The annual report format is provided in this handbook.

(3) Length of Storage. Keep completed VE study proposal books on file for at least three years, or longer if the Bureau/Office audit period is greater. After that period, keep them in dead storage for another three years or follow Bureau/Office archiving procedures before destruction. Keep accurate books on all monies obligated, proportioned, and claimed as savings.

(4) Cross Feed of Information. A cross-feed system of study recommendations, distinguishing accepted versus unaccepted, is useful in documenting alternatives. A computer program is usually considered to best serve that purpose. Consideration should be given to breaking studies into the specialized areas that govern team selection and distributing the results to those disciplines. In the example of the research laboratory, since the architectural, mechanical, and structural fields required the most work, the alternatives generated by the study would most likely apply to those disciplines and should be highlighted that way. Each office should get several summaries of the study; however, the architectural, mechanical, and structural sections should each get a highlighted copy. When preparing reports, exercise VE principles of using the fewest words possible. Be certain the before and after descriptions are clear and that costs and savings are complete and accurate. Be certain that value engineering is given credit as the medium

for accomplishing the actions. Always include credits for VE team members and others involved in bringing about change. Every report of before and after actions should include a place for this information.

f. Publicity. Set a theme for the VE program, such as describing it in terms of a tool for exercising Total Quality Management or a means for improving the products and services of the Bureau or Office. Out of sight is out of mind. Use a bulletin board to display photos of VE teams in current studies, pictures of presentations, awards made for outstanding VE efforts, and similar news. Use your creativity.

SECTION C - Value Engineering Change Proposals

Processing Requirements; Process Methodology; Responsibilities; Handling Procedures

SECTION C - Guidelines for Processing
Value Engineering Change Proposals (VECPs)

1. Processing Requirements

a. The requirements of OMB CIRCULAR NO. A 131, dated January 26, 1988, paragraphs 4. b. and subparagraphs (1) through (6), shall be met. The requirements pertaining to the submission and disposition of a VECP included in Parts 48 and 52 of the Federal Acquisition Regulations (FAR) shall be followed.

b. VECPs will be actively solicited from all contractors and subcontractors with the exception of architect engineers.

c. The contracting officer (or technical representative) will ensure the value engineering clause at FAR 52.248.1, Value Engineering, is included in all appropriate contracts as prescribed in Part 48 of the FAR. If the VE clause is not included in contracts greater than $100,000, reasons shall be explained in a memo to the file. Contracts between $10,000 and $100,000 will contain the VE clause at the discretion of the contracting officer. Contracts of $10,000 or more which do not contain the VE clause initially may have it added at the contractor's request.

d. The contracting officer (or technical representative) will emphasize and encourage use of the VECP Incentive Clause by issuing a letter inviting participation and a Department of the Interior VE pamphlet (Exhibits A and B); present a briefing at the preconstruction or pre-contract meeting; furnish blank VECP forms with instructions for their use; and offer training in value engineering.

e. The contracting officer (or technical representative) will inform the contractor that an oral disclosure of a VECP will not jeopardize his/her right to file a formal proposal if it occurs within a reasonable time period. It is often advantageous to pass the VECP through the chain of review informally before encouraging the contractor to expend time and

money for a formal submittal. Assurances are never given; however, suggestions and objections may surface to assist in preparing a more sound submittal with a higher possibility of acceptance.

f. A fair and objective review shall be assured for VECPs. Modifications to the VECP may be recommended to overcome objections. Negotiations for all VECP actions remain with contract administration. If modifications to the VECP are rejected by the contractor, the Government may issue a change order to incorporate the modified VECP. In that event, the contractor retains the right to share in any cost reductions.

g. Rejection of any VECP must list sound engineering and technical reasons. The contracting officer must prepare a letter to the contractor listing all the reasons why the proposal was rejected.

h. VECP review shall be conducted in a timely and positive manner. The contracting officer is responsible for accepting or rejecting a VECP within 45 days according to FAR 48.103(b). If additional time is required the contracting officer must notify the contractor promptly, in writing, giving the reasons for the delay and the anticipated decision date.

i. Decisions on VECP acceptance or rejection must be timely. Delays for VECP review are not compensable to the contractor. VECP processing will receive priority treatment, including hand-carrying between same site offices and overnight mail or FAX between remote offices. Processing VECPs may benefit by establishing a timetable of review and processing activities. Times shown are suggested and will be adjusted within the time stated in the VECP, unless it is shown to be unrealistic.

2. Plan of Action for Processing VECPs.

a. The contracting officer receives the original VECP and two (2) copies; forwards one (1) copy to the technical reviewing office the contracting officer selects and one (1) copy to the Value Engineering office; and includes a summary of the recommendations and comments of her/his staff. 2 days

b. The contracting officer office reviews the VECP submittal and determines the level and location of review required for evaluation through a conference with the Value Engineering office. The contracting officer will forward complete VECP packages to those offices whose participation is necessary for review. 1 day

c. The Value Engineering office tracks review progress and advises the contracting officer if review encounters delays. Negotiations with the contractor are the responsibility of the contracting officer. Review and coordination time. 5 days

d. The reviewing office prepares the reply to the VECP for the contracting officer's signature. It will contain sound engineering and technical reasons for Notice to Proceed (NTP) or rejection. Review and approval obtained in accordance with bureau procedures. 2 days

e. The contracting officer (or technical representative) negotiates the change with the contractor. 2 days

f. The contract administration office prepares and issues the contract Change Order to the contractor and sends one (1) copy to each office impacted by the action. 5 days

3. Responsibilities.

a. The contracting officer has total responsibility for VECP activities and maintaining the VE review schedule. The contracting officer will forward the proposals to the correct offices for review and recommendations, review input from all sources and prepare correspondence over his/her signature recommending acceptance or rejection of all VECPs. The contracting officer shall provide the Value Engineering office with a semi-annual report containing information regarding VECPs submitted, approved, or rejected; size of contracts involved; and dollar savings attributed to VECP acceptance.

b. The design or engineering office shall provide technical assistance, estimated savings review, and furnish written comments and recommendations when requested by the contract officer. It will coordinate VECP review input with any A-E design firm involved, reserve necessary funds for A-E review and input, and issue a memo summarizing the A-E's comments and recommendations.

c. Once a VECP is accepted, process it in precisely the same manner as any other change order to the contract. The process and chain of responsibilities will follow existing procedures.

EXHIBIT A

ADDRESS

Gentlemen:

Please take the opportunity to examine the clause at FAR 52.248-3, Value Engineering - Construction in your contract. It is included for the purpose of reducing Government construction costs by utilizing your experience and ingenuity. As an incentive, the savings you cause will be shared between you and the Government in accordance with paragraph (f) of the clause.

Experience has proved that early action to search the plans and specifications for ways to accomplish the work at least cost without reduction of quality or reliability will result in maximum savings. I urge you to do this as soon as possible.

Prior to any submittals for change proposals, however, I recommend you discuss any ideas you have with the authorized contracting representative and make an informal determination as to their acceptability. If the preliminary findings are favorable, your formal proposal will be expedited in its consideration. In this way the work can be accomplished with a maximum benefit to you and a minimum cost to the taxpayer.

Your VECP must be submitted to the contracting officer via the contracting officer technical representative and should follow the format outlined in the enclosed Value Engineering Proposal form. If further information is required, please contact _____.

My value engineering staff is available to train your management and employees with brief seminars on the subject of Value Engineering.

I encourage and solicit your participation in this program.

Sincerely,

4. VECP Handling Procedure

a. The contractor initiates a value engineering change proposal to his/her contract. It may be a simple substitution of one item, material, or product for another. It can be a more sophisticated method of performing a task in much less time. In any event, the VECP must do two things:

(1) Require a change to the contract to implement the VECP.

(2) Result in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided that it does not involve a change:

(a) In deliverable end item quantities only; or
(b) To the contract type only.

For example, the contractor cannot recommend reducir the amount of fill by 50% and ignore the elevation required for the fi l foundation. The contractor cannot recommend changing the contract from a fixed-fee to a cost plus contract.

b. The VECP must be very detailed and complete, which does not necessarily mean long. FAR 52.248-3, (c) (1) through (7) describes what must be included in the proposal.

c. To evaluate the proposal three things are needed as a minimum:

(1) Is it technically sound? Will it fit into the existing concept and work as well or better than the present concept?

(2) Are the contractor's costs correct and reasonable? A Government estimate should be prepared in-house for comparison.

(2) Are the contractor's costs correct and reasonable? A Government estimate should be prepared in-house for comparison.

(3) Are the contractor's mark-up percentages correct and reasonable? Is an audit required or is the preconstruction award audit recent enough to use?

d. Who is best suited to perform these and other evaluations? Depending upon your organization, the needed skills will be found in different departments. Some may have estimating as a separate section. Some may have estimating done by each design engineer. You will have to locate and name the skills you need to get a sound appraisal accomplished.

e. It may be best to allocate that function to the Contract Administration group. Do not bypass the normal chain of command in dealing with contracts. Usually all contact will be via the staff having direct interface with the contractor. That staff may fall under such titles as Area Engineer, Project or Resident Engineer or Project Manager. They will answer to a Contract Branch, Procurement Branch or Office, or a Contract Administration Group, or similar titles.

The Project Engineers/Managers are specialists in converting plans to reality and should have a good idea of where the evaluation should be made. Often, they can make it with their own project engineering staffs. Sometimes it may require Real Estate, Procurement, or a very different group from our usual assumption that Engineering Division will evaluate all proposals.

5. Initiating Review of the VECP.

a. The Area, Resident, or Project Engineer (AE, RE, or PE) should establish a rapport with the contractor regarding VECPs by briefings, handouts and discussions.

b. The contractor should be assured that oral divulgence will not jeopardize the VECP if it is followed by a written proposal within a reasonable time.

c. The Project Engineer then calls the likely decision-maker and explains the contractor is considering proposing a change. The initial review and discussion of the proposed change(s) then begins with in the organization. All necessary parties should be contacted informally to discuss the proposed change(s).

d. After internal review and consideration, the Project Engineer meets with the contractor and conveys the Bureau's concerns and understanding of the change proposal, and any suggested modifications to the change proposal that would address any objections to the proposal.. The contractor then determines whether or not to prepare a formal VECP.

6. Programming VECP Review

a. When the VECP is received by the Contract Administration group, it must be determined what skills are required to make the evaluation and a time table established to match the review schedule to the cutoff time specified by the contractor for an answer.

People working with the contractor have the best ability to estimate the level of impact on the contract if delays occur in processing the proposal.

b. Fully coordinate all the activities with the Value Engineering office.

7. Summary of Findings. When the reviewers have finished, they will return all the materials to the Contract Administration group. It will examine the input, clarify content with contributors, and summarize the findings into correspondence to the contractor for the contracting officer's signature.

8. Negotiation. The Project Engineer/Manager will negotiate the VECP with the contractor and send the results to contract administration. A Notice to Proceed (NTP) should not be issued until negotiations have been completed on costs and savings.

9. Sharing Savings. Sharing varies depending upon the type of contract. On instant construction contracts sharing is 55%-45% between the contractor and the Government. In addition, a contractor can receive a 20% share of collateral savings for an average year unless that provision is struck from the clause by the head of the department. That share can reach $100,000 or the contract's firm-fixed-price at the time the VECP is accepted, whichever is greater. See paragraphs (f) and (g), FAR 52.248-3.

SECTION D - Annual Report of Value Engineering Activities

1. Instructions for completing Annual VE Summary Report

2. Annual VE Summary Report Form

Instructions for Completing Bureau/Office Annual

Summary Report of VE Activities

REPORTING ACTIVITY: Insert the Bureau/Office Designation

FY: Insert the current fiscal year

DATE: The report must be received approximately 60 days following the end of the Fiscal Year. Insert actual date sent.

I. ADMINISTRATION

The number of people employed during the Fiscal Year should be entered. This information should be obtainable from personnel departments. The number of people trained should be obtainable from the VE Program Coordinator.

The intent of these numbers is to determine if a sufficient reservoir of people is being maintained to support all types of VE activities.

VE staff numbers are self-explanatory.

II. LIST OF PROJECTS

The dollar threshold for construction projects which become part of the six (6) percent savings goal is $500K. Projects below that amount are to be studied if poor value is found. This information will assist in determining how appropriate the threshold figure is and where the majority of VE opportunity occurs. The number of studies conducted is not a goal; however, it is a good indicator of the aggressiveness of the VE program.

Insert the numbers of projects in either In-House or A-E sections with an estimated construction cost above the figures indicated. Insert the numbers of them that were identified for study in the adjacent columns.

III. NUMBER OF VALUE ENGINEERING STUDIES

Under this subject are a series of actions listed which are a measure to judge both VE activity and support. These study activities only apply to the in-house program which include studies done by government personnel or A-E personnel under contract. Insert numbers in each column to show what activity occurs at each of these important phases of a VE study cycle.

IV. VALUE ENGINEERING CHANGE PROPOSALS (VECPs)

These numbers also measure the level of support for this area of the VE program. Every contract over $100K must have the FAR VE clause in it. The VE goals of the DOI VE Departmental Manual require the Bureau/Office to obtain one VECP for each contract in their jurisdiction that exceeds $1000K.

Fill in the numbers of contracts in effect at the time of reporting that fall in each of those dollar amounts.

The contracting office should have all information required in this block which should allow quick tracking of where each VECP stands. Fill in the numbers initiated, accepted, rejected and withdrawn at the time of the report to show how well the VECP program is progressing.

V. VE PROGRAM COSTS AND SAVINGS (Thousands $'s)

Enter in the savings row the gross amounts of savings reported by studies done by in-house government personnel and A-E personnel under contract for the Fiscal Year being reported. Also show the gross savings from the VECP program. Savings and costs from VECP's should be reported separtely, do not combine with study results. Savings shall be reported in the Fiscal Year in which the project is under construction. Savings for projects requiring several years to construct may be prorated over the construction period.

Enter in the cost row all costs for redesign, etc. for in-house efforts and for contract costs of studies by A-E firm personnel. Enter costs of the VE staff and all other associated costs for the VE program. Under VECPs, include all government costs required to process VECPs.

Enter in the net row the amount of savings by deducting all costs from gross savings. Compute the return on investment (ROI) by dividing the net savings by the costs.

SPECIAL NOTE: Report savings for only those projects that went into construction in the reporting Fiscal Year. ALSO - Be sure to report all other VE program costs and also report/list separately costs and savings data for Operation and Maintenance, Grants, and Planning related VE studies.

VI. RECOGNITION

These columns are self-explanatory. The intent is to determine what support and encouragement is being given in-house personnel for outstanding work in the field of VE.

COMMENTS AND ADDITONAL INFORMATION

Enter any information that explains parts of the report not clearly defined by the numbers. Also, provide any data/information regarding O&M and Grants related VE activities.

SUMMARY REPORT OF VALUE ENGINEERING ACTIVITIES

BUREAU / OFFICE FY DATE

_____ _____ _____

I. ADMINISTRATION

No. of people in engineering and/or construction program:_____

	Seminars	40-Hr. Workshop
No. of people from those areas trained in Value Engineering during reporting period:	_____	_____

VE Staff:	Professional	Technical	Clerical
Full-time:	_____	_____	_____
Part-time:	_____	_____	_____

II. LIST OF PROJECTS

	Projects designed In-House		Projects designed by A/E	
	No. Projects	Selected for VE Study *	No. Projects	Selected for VE Study *
$250K+	_____	_____	_____	_____
$500K+	_____	_____	_____	_____
$1000K+	_____	_____	_____	_____
$2000K+	_____	_____	_____	_____

* Report/List separately all projects that were <u>not</u> studied, with reason for exemption; i.e., design schedule slipped into next FY; expected ROI does not support need for VE study; etc.

** List separately any grant construction projects funded (partially or fully) during this reporting period that included a recommendation to the grantee to conduct a VE analysis.

III. NUMBER OF VALUE ENGINEERING STUDIES

	VE STUDY RECOMMENDATIONS					
Studies Completed		100 % Approved		Partially Approved		Rejected/ Nonproductive	
IH	AE	IH	AE	IH	AE	IH	AE

IV. VALUE ENGINEERING CHANGE PROPOSALS (VECPs)

Number of Active Construction Contracts for Reporting Period

$100K + _____

$1000K + _____

Number of Value Engineering Change Proposals

Submitted: _____

Accepted: _____

Rejected: _____

Withdrawn: _____

V. VE PROGRAM COSTS AND SAVINGS (Thousands $'s)

	In-House Studies	A/E Studies	VECP
Savings ($)			
Costs ($)			
Net ($)			
R O I			

No. of Operation and Maintenance VE Studies performed: _____

No. of VE studies performed on projects in planning stage: _____

No. of VE Studies performed related to Grant projects: _____

*** Report all all other VE program costs: _____
(FTE's, overhead, travel, printing, etc.)

*** Report/List separately all costs and savings data for Operation and Maintenance and Grants related VE studies.

*** Report/List separately projects in planning stage subjected to VE study and describe results of study.

VI. RECOGNITION

Number of Awards Issued	Type of Award		Dollar Amount	
	Special Act	Monetary	Per Team	Individual

SECTION E - Example Forms of VE Studies

The VE study examples demonstrate the use of some of the forms utilized in conducting value engineering and analysis studies.

VALUE ENGINEERING PROPOSAL

STUDY NUMBER VE-4

PROJECT VISITOR VIEWING PLATFORM

LOCATION HOOVER DAM ARIZONA/NEVADA

TEAM MEMBERS

Mark Rubst - Team leader, CE, Denver
Bill Arnat - Recorder PE, LCR
Amy Daniels, CE, LCR
Bill Beiler, CE, Washington, D.C.
Tom Meagher, CE, NPS
Don Guptail, Field Engineer, Grand Coulee

CONSULTANTS

Means Cost Estimating Guide.
Design Data, LCOPO

VE SIGNATURE: _____

DATE: _____

INFORMATION

ITEM UNDER STUDY: VISITOR VIEWING PLATFORM

BASIC FUNCTION(S): _____ _____

FUNCTION(S) BEING ANALYZED: _____ _____

SPECIAL CRITERIA

USER'S: Universal Accessibility
Eliminate Visitor/Employee conflicts
Increase visitor attendance/tour size.
Eliminate need for visitors to use 3rd Floor access

CODES: All codes
Bureau of Reclamation's Construction
Safety Standards (latest Edition).
Energized Circuits Section.

RESTRICTIONS: Interior improvements removeable
Overhead gantry crane (max ht. 10'-0").
Energized circuits clearances.
Preserve historic fabric of structure.

DESIGN HISTORY: (RESPONSIBILITIES, COMMITMENTS, STATUS, ETC.)

The project evolved out of a need to limit or exclude tours from the 3rd Floor of the Nevada/Arizona powerplants. An elevated walkway was selected as the method to accommodate the need to access the tailrace of the dam for photo opportunity Concept C, May 30, 1990., $1MM, project on HOLD

ITEM/FUNCTION COST MODEL

PROJECT:

STUDY ITEM:

BID ITEM / Function(s)	%	PERCENTAGE OF STUDY ITEM 0 10 20 30 40 50 60 70 80 90 100	TOTAL $ (IN $)
VISITOR WALKWAY	38		225,000
VIEWING PLATFORM	27		165,000
Modify ELECTRICAL	20		122,000
CONTINGENCY	15		76,900
TOTAL	100%	TOTAL CONSTRUCTION COST	$

ITEM/FUNCTION/COST MODEL

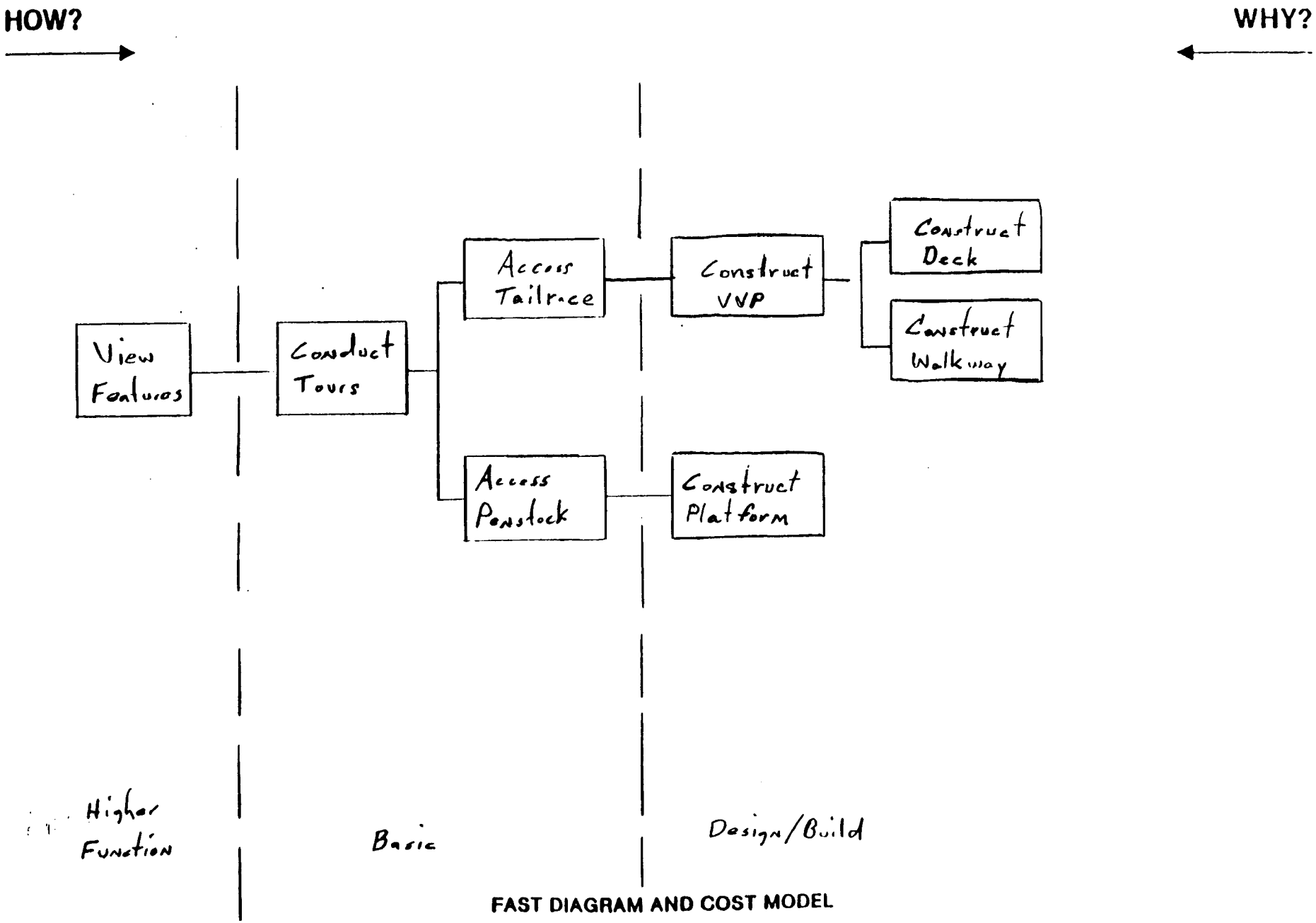
FUNCTION ANALYSIS AND COST/WORTH WORKSHEET

PROJECT: VISITOR VIEWING PLATFORM STUDY ITEM: VE-4

ITEM OR COMPONENT UNDER STUDY	FUNCTION(S)			PRESENT COST(S)	WORTH		V.I.
	VERB	NOUN	TYPE		INITIAL ALTERNATIVE(S)	ALTERNATIVE COST(S)	
VVP	Access Conduct	Tailrace Tours	B	3,027,677	VVP on hinge	1,246,141	1.6

NOTES: Type of Function : B = Basic, 2nd = Secondary; Present Cost (C) is From Estimate.
Initial Alternative: Mini-Brainstorm; Alternative Cost (W) Lowest known cost to satisfactorily achieve the function
V.I. is Value Index (C/W); C/W < 1 = GOOD VALUE, C/W > 1 = POOR VALUE; POOR VALUE ITEMS SHOULD STUDIED

ORIGINAL

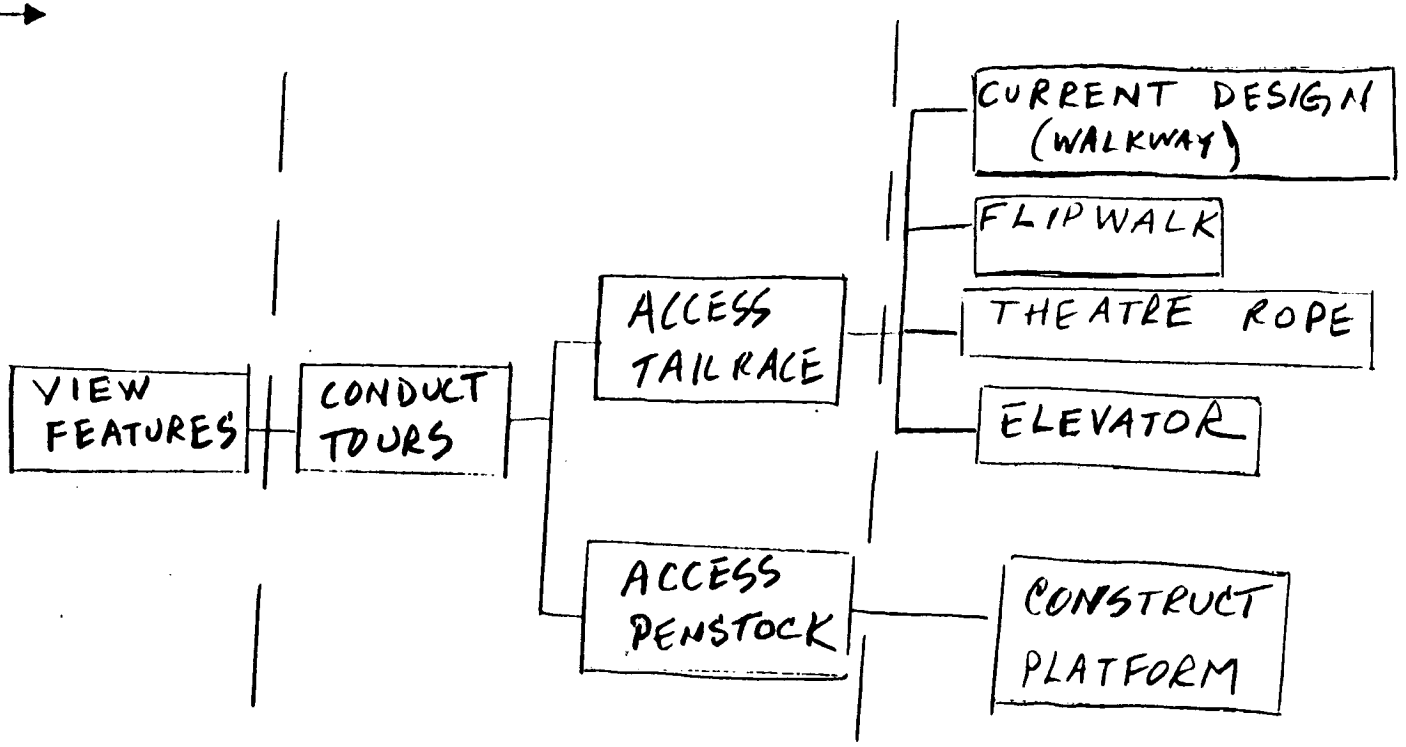


FAST DIAGRAM AND COST MODEL

FINAL

HOW? →

← WHY?



HIGHER FUNCTION

BASIC

DESIGN BUILD

FAST DIAGRAM AND COST MODEL

SPECULATION PHASE

Applied Creativity To Generate Alternatives

FUNCTION BEING ANALYZED: Conduct Tours

PROJECT: Visitor Viewing Plat. STUDY ITEM / NO.: VE-4

1. Guided
2. Self-guided
3. Hybrid (self/guided)
4. Reservations
5. VIP Tours
6. Quickie Tours
7. Wives Tours
8. Ma & Pa Tours
9. Mother-in-Law Tours
10. Vehicle Tours
11. Night Tours
12. 24 hr. Tours
13. Extended hrs tours
14. Special H.C. tours
15. Eliminate tailrace from tr.
16. Powerplant balcony
17. Penstock
18. Galleries.
19. Bus Gallery
20. Governor Room
21. Switchyard
22.
23.
24.
25.

SPECULATION

CRITERIA WEIGHING PROCESS

PROJECT : VISITOR VIEWING PLATFORM STUDY ITEM / NO. : VE-4

CRITERIA	RAW SCORE (WEIGHT)
A. SAFETY	17
B. UNIVERSAL ACCESS	8
C. INTERFERENCE	10
D. VISITOR EXPERIENCE	5
E. ACTIVE / PASSIVE	+7
F. COST	-0-
G. HISTORIC PRESERVATION	2
H. DESIGN CAPACITY	17

How Important

4 - Major preference
3 - Medium preference
2 - Minor preference
1 - Letter/Letter - no preference each scored one point

	B	C	D	E	F	G	H
A	A2	A2	A4	A2	A4	A3	A/H
B		B/C	B2	E3	B4	B2	B/H
C			C3	E3	C3	C4	C/H
D				E2	D3	D2	D/H
E					E4	E3	E2
F						G2	H3
G							H4

Note : Drop Criteria with a Raw Score of 1
(Criteria which gets dropped may be considered in Advantages/Disadvantages Analysis)

ANALYSIS

ANALYSIS MATRIX VE STUDY NO: 4

SUBJECT: VISITOR VIEWING PL. FUNCTION: _____ _____

COMPONENT OF: _____

COST / WORTH = $ / $ DISCUSSION: _____

_____

DESIRED CRITERIA

FUNCTION FOR STUDY: / ALTERNATIVES	RELATIVE WEIGHTS	PROFORMS FUNCT.	FIRST RANKING	Safety	Design Capacity	Interference	Universal Access	Active / Passive	Visitor Experience	Historic Preservation		TOTAL	FINAL RANKING
		20		17	17	10	8	7	5	2			
1 VVP		4/80		2/34	2/34	5/50	5/40	2/14	3/15	1/2		269	3
2 VVP + Mods		5/100		2/34	2/34	4/40	2/16	2/14	3/15	1/2		255	4
3 Rooftop access		4/80		5/85	4/68	1/10	3/24	2/14	5/25	5/10		316	1
4 Management		4/80		3/51	4/68	1/10	3/24	2/14	5/25	5/10		282	2
5													
6													
7													
8													
9													
10													
11													
12													
13													

EXCELLENT-5 VERY GOOD-4 GOOD-3 FAIR-2 POOR-1

ALTERNATIVE EVALUATION

PROJECT VISITOR VIEWING PLATFORM STUDY ITEM VE-4

FUNCTION BEING ANALYZED _____

NO.	SELECTED ALTERNATIVES	ADVANTAGES	DISADVANTAGES	IDEA RATING
1.	Rooftop access	1. No overhead hazards 2. Spacious 3. Alternate queue area	1. Restricted view (too close) 2. Historic disruption. 3. More O & M (elevator)	
2	Management	1. No major construction 2. Best view 3. Preserves historic integrity	1. Conflicts w/movement 2. Employment conflicts 3. Tour queue	
3.	VVP	1. No 3rd floor conflicts 2. Good view 3. H.C. accessible (one flr)	1. Tour Personnel dislike 2. Creates awkward queue 3. Req's removable walkway 4. Proximity to H.T. lines. 5. Overhead hazards 6. Compounds O & M activities 7. Minor historic disruption	
4	VVP + Mods	(Some as 1, 2, & 3 above) Applies to #3 & #4		

COST ESTIMATE FORM

PROJECT : _____ STUDY ITEM / NO. : _____

ITEM / DESCRIPTION	QTY.	UNIT COST	TOTAL COST
VVP #3			
Walkway construction	-	L.S.	225,000.00
Viewing platform	-	L.S.	165,000.00
Electrical modifications	-	L.S.	60,000.00
Contingency		L.S.	67,500.00
Total			517,500.00
Management #2			
Barrier ropes, bollards 2000'	lf	4.00	8,000.00
Stands 20 req'd	ea	100.00	2,000.00
Signage 50 req'd	ea	100.00	5,000.00
Mat. Area = 5k ft		L.S.	5,000.00
Personnel. - 10 add. guides			20,000.00
@ $30,000/yr. x1.3 =			260,000.00
			280,000.00
Rooftop Access #1			
Mobilization @ 3%		L.S.	22,900.00
Structural demolition		L.S.	30,500.00
Penthouse structure		L.S.	45,000.00
Hoistway construction		L.S.	240,000.00
Elevator and Lobby constr.		L.S.	210,000.00
Rooftop shelters	4,200	lf.	78,000.00
Benches	20	ea	10,000.00
Walkway / topping	18,000	sf	22,500.00
Guardrailing	4,000	lf.	80,000.00
Exterior electrical		L.S.	20,000.00
Interior electrical		L.S	20,000.00
HVAC		L.S	6,500.00
			785,400.00
25% Contingency			196,350.00
			981,750.00

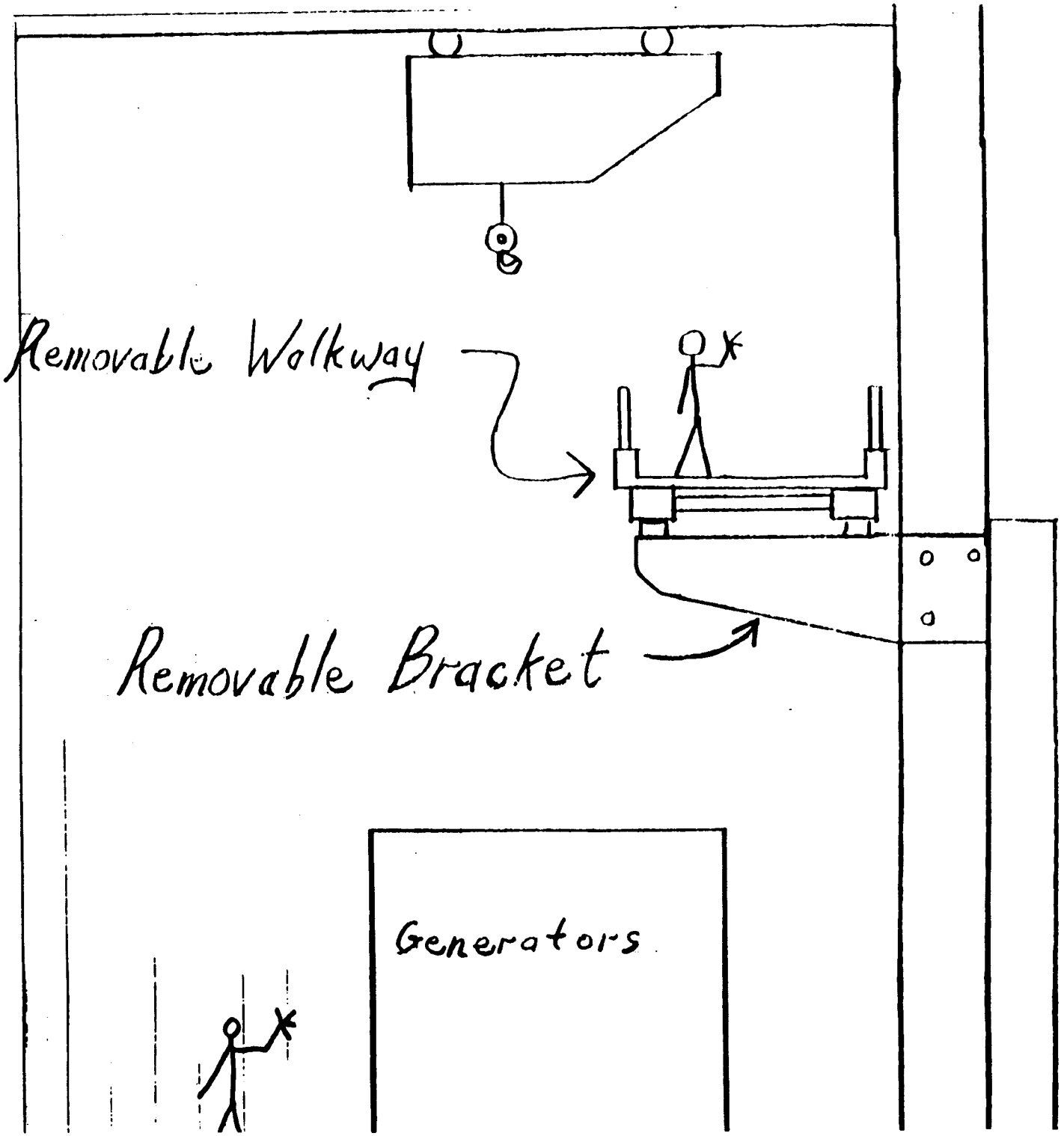
ESTIMATE

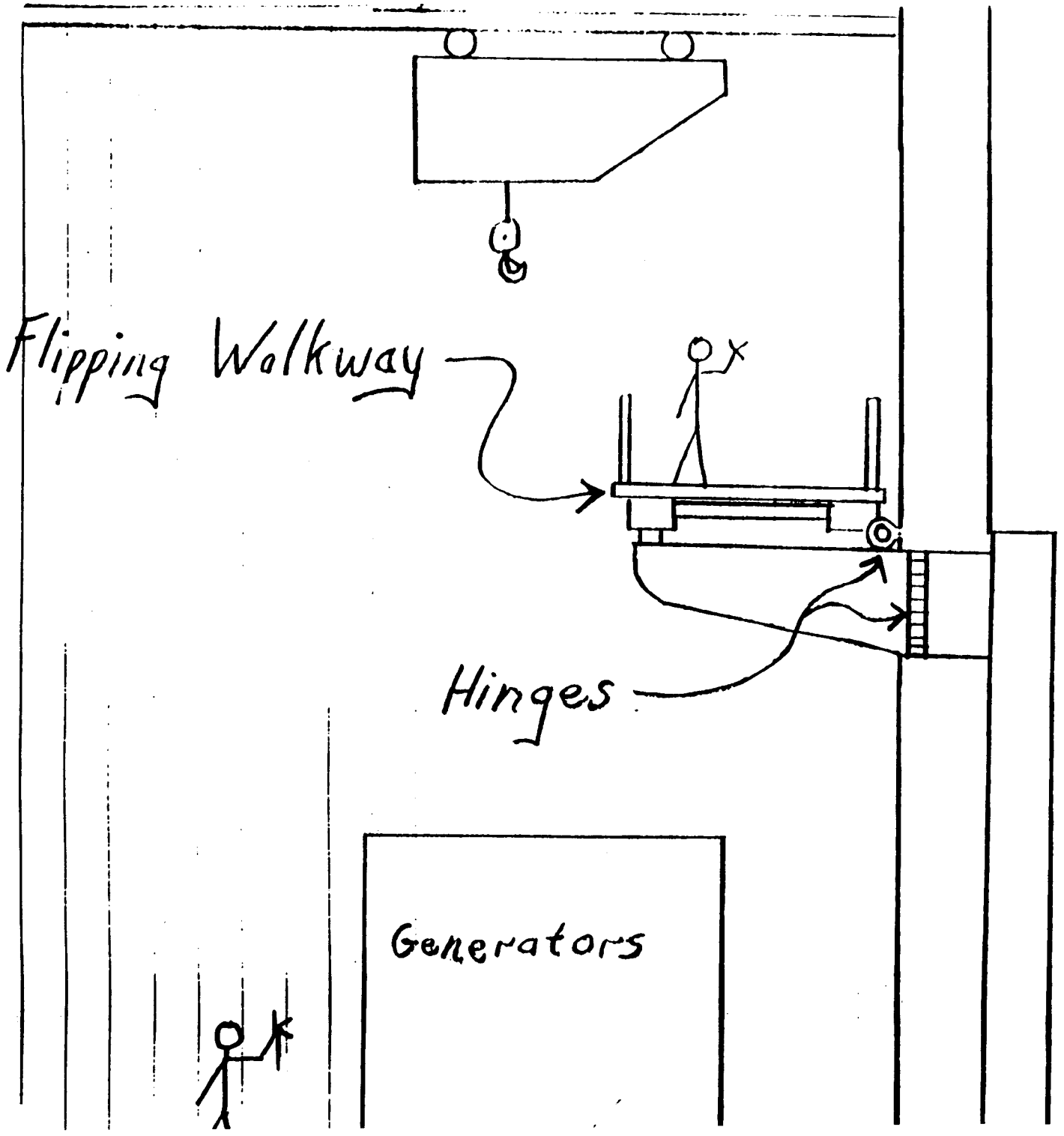
LIFE - CYCLE COST ANALYSIS
Using Present Worth (PW) Costs

PROJECT : Visitor Viewing Plat
STUDY ITEM / NO. : _____

	VVP ORIGINAL		Management ALTERNATE NO. 1		Rooftop Acce ALTERNATE NO. 2		VVP + Mods ALTERNATE NO. 3	
	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth
COLLATERAL / INITIAL COSTS	517,500	517,500	20,000	20,000	981,750	981,750	543,375	543,375
Base Cost								
Interface Costs								
a. USBR Overhead @ 30%	135,250	135,250	–	–		294,530		163,000
b. Lost O&M productivity	30,000	30,000	–	–		-0-		30,000
c. _____								
Other Initial Costs								
a. _____								
b. _____								
TOTAL INITIAL COST IMPACT (IC)	702,750	702,750	20,000	20,000		1,276,280		736,375
SALVAGE & REPLACEMENT COSTS								
Single Expenditures @ 10% Interest								
1. Year 5 PW Factor 0.621	15,000	9313	20,000	12,420	60,000	37,260	15,000	9,313
2. Year 10 PW Factor 0.386	15,000	5783	20,000	7,710	60,000	23,160	15,000	5,783
3. Year 15 PW Factor 0.239	15,000	3,591	20,000	4,782	60,000	14,340	15,000	3,591
4. Year 20 PW Factor 0.149	15,000	2,229	20,000	2,972	60,000	8,940	15,000	2,229
5. Year _____ PW Factor _____								
Salvage Present Worth	-4,500	-420		-0-		-0-	-4,000	-400
TOTAL PRESENT WORTH		20,496		27,888		83,700		20,516
ANNUAL COSTS (Based on Present Worth of Annuity)								
Annual Costs @ 10% Interest								
a. Maintenance								
Escal. Rate ____ PWA Factor 9.077	18,930	171,828		-0-	60,000	544,620	17,900	162,478
b. Operations								
Escal. Rate ____ PWA Factor 9.077	125,000	1,134,625	260,000	2,360,000	100,000	907,700	36,000	326,772
c. Others								
Escal. Rate ____ PWA Factor _____								
d. Others								
Escal. Rate ____ PWA Factor _____								
TOTAL ANNUAL COSTS		1,306,453		2,360,000		1,452,320		489,250
TOTAL PRESENT WORTH COSTS		2,029,699		2,407,888		2,812,300		1,246,141
LIFE CYCLE (PW) SAVINGS								

LCC


Removable Walkway
Removable Bracket
Generators


Flipping Walkway
Hinges
Generators

VALUE ENGINEERING PROPOSAL

PROJECT: Visitor Viewing Platform, Hoover Dam
LOCATION: Arizona / Nevada
STUDY ITEM / NO.: VE-4
ITEM'S FUNCTION(S): Conduct Tours, Access Tailrace

ORIGINAL CONCEPT	VE CONCEPT
Build walkway on Level 5 along interior powerhouse wall over generators to an exterior viewing platform for viewing Hoover Dam. The original concept has removeable sections for access to generators equipment. Current method is to remove sections with crane and store in warehouse.	Design, fabricate, and install walkway on hinges to swing walkway sections out of the way. Supports will also swing out of the way for storage.

COSTS	INITIAL	LIFE CYCLE	TOTAL
ORIGINAL CONCEPT	702,750	1,326,949	2,029,699
VE CONCEPT	736,375	509,766	1,246,141
SAVINGS			783,558

IMPLEMENTATION COSTS (INCLUDING REDESIGN)		
	SUBTOTAL (ROUNDED)	
	IMPLEMENTATION COSTS	
	NET SAVINGS	

PROPOSAL

VALUE ENGINEERING SERVICES TRANSWORLD

IMPLEMENTATION SHEET - SUMMARY ACTIONS - ATTACH DETAILS

FUNCTION	WHAT	WHO	WHEN
APPROVE	VVP w/ m-l's	Hoover Dam	ASAP
SCHEDULE	"	Hoover Dam	"
REDESIGN	"	Regional/DO	"
ESTIMATE	"	Region/DO	"
BUDGET	"	Region/DO	"
COORDINATE	"	Region/DO	"
~~TEST~~			

The environment you are entering carries many roadblocks, such as:

Personal risk. Is the change safe or is there risk? How much?

Change. Will turf be reshuffled? Will there be big losers? Is relearning required? Will it be traumatic or small?

Time. Will the proposal fit into present schedules for completion or delivery? Will it shorten present schedules?

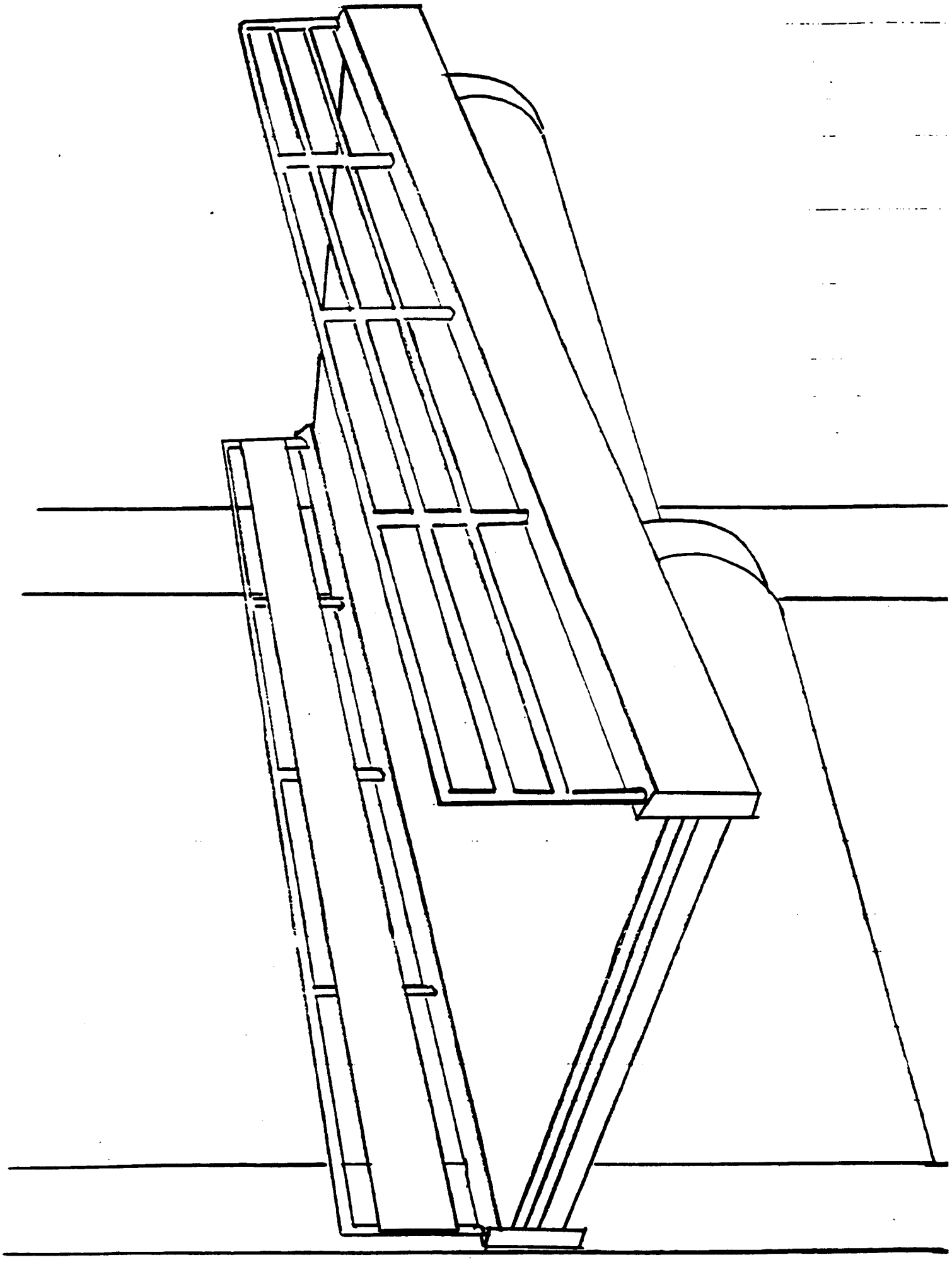
Benefits. Who are the big gainers? Who are the losers? Do both individuals and the organization benefit?

That list barely scratches the list of roadblocks that will flow across the path of implementation. Any manager knows that if one can delay a decision for just two or three weeks, the enthusiasm of a fresh idea will be dampened by the weight of habit and special interests and it will be back to business as usual. And so to sleep.

ADVANTAGES: Ease of maintenance, lower cost

DISADVANTAGES: Ignores queue.

The functions shown are suggested active verbs. Use those functions applicable to your project.



VALUE ENGINEERING PROPOSAL

STUDY NUMBER VE-7 6/92

PROJECT REHABILITATE CANYON SEWAGE TREATMENT

LOCATION CANYON VILLAGE, YELLOWSTONE NATIONAL PARK

TEAM MEMBERS

KEN SMITH, MECHANICAL ENGR KRS

JACK CRUZ, CONTRACT MANAGER JTC

BOB SUND, MECH/STRUCTURAL ENGR RJS

PAUL SANTOS, CONTRACT ADMINISTRATOR PS

VANCE GREER, PHYSICAL SCIENTIST VWG

MIKE DWORSKY, SANITARY/CIVIL ENGR

CONSULTANTS

JOHN CRIGER (NAT PARK SERVICE)

DOUG DENILE - SAN ENG NPS-DENVER

CUSTOM FENCE DENVER (TELEPHONE LOG)

ELCAL FENCE - DENVER

VE SIGNATURE: Mike Dworsky, CAPTAIN

DATE: 6-12-92

INFORMATION

ITEM UNDER STUDY	FENCING - CANYON WTP IMPROVEMENTS	
BASIC FUNCTION(S)	PROTECT PROPERTY	DECREASE LIABILITY
FUNCTION(S) BEING ANALYZED	SAME	SAME

SPECIAL CRITERIA

USER'S: DAY VISITORS, PARK SERVICE HOUSING, CONCESSIONERS, NEED IMPROVEMENTS TO THE EXISTING WASTEWATER TREATMENT AND COMPLY WITH THE WYOMING DEQ REQUIREMENTS.

CODES:

RESTRICTIONS: THE NATIONAL PARK SERVICE HAS AN EXISTING ACTIVATED SLUD TREATMENT PLANT SERVING THE CANYON VILLAGE AREA IN YELLOWSTONE NATIO PARK. THE WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY HAS INDICATED THAT UNLESS SUBSTANTIAL AND MAJOR REVISIONS ARE MADE, THE DISCHARGE PERMIT WILL NOT BE ISSUED.

DESIGN HISTORY: (RESPONSIBILITIES, COMMITMENTS, STATUS, ETC.) WYOMING DEQ ISSUED NOT OF VIOLATION. THE NPS PREPARED ENVIRONMENTAL ASSESSMENT AND AN ENGINEERING STUDY OF WASTEWATER TREATMENT PLANT ALTERNATIVES. PROJECT HAS GONE TO BID TWICE AND IS CURRENTLY WAITING APPROVAL TO AWARD FROM HQRT'S. TOTAL BUDGET WAS ANTICIPATED TO BE $5.4 MILLION

PARK: YELLOWSTONE NATIONAL PARK SOLICITATION NUMBER: IFB YELL-809
PARK AREA: CANYON VILLAGE
PROJECT TITLE:
REHABILITATE CANYON SEWAGE TREATMENT FACILITY

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	GOVERNMENT ESTIMATE
1	ADVANCED WASTEWATER TREATMENT PLANT	1.00	LS	3900000.00	3,900,000.00
2	DEMO OF EXISTING 100,000 GAL. SEPTIC TANK	1.00	LS	1000.00	1,000.00
3	AGGREGATE BASE COURSE	4400.00	TONS	18.00	79,200.00
4	BITUMINOUS CONCRETE PAVEMENT	560.00	TONS	75.00	42,000.00
5	STONE TREEWALL	350.00	LF	9.00	3,150.00
6	VINYL CLAD CHAIN LINK FENCING	4300.00	LF	18.00	77,400.00
7	VINYL CLAD CHAIN LINK GATE	24.00	LF	60.00	1,440.00
8	MULCH	500.00	CY	20.00	10,000.00
9	REPAIR WALKS	240.00	SY	40.00	9,600.00
10	REPAIR CONCRETE CURB/GUTTER	115.00	LF	20.00	2,300.00
11	REPLACE STANDARD MANHOLE	23.00	EA	2000.00	46,000.00
12	CONST. NEW STANDARD MANHOLE	3.00	EA	1500.00	4,500.00
13	EXTRA DEPTH FOR STANDARD MNHLE	92.00	LF	200.00	18,400.00
14	DROP CONNECTION	4.00	EA	600.00	2,400.00
15	MANHOLE REPAIR-GROUT EX. CONN.	2.00	EA	200.00	400.00
16	MANHOLE STUB REPLACEMENT	4.00	EA	200.00	800.00
17	MANHOLE REPAIR-REP. FRAME/COVR	3.00	EA	500.00	1,500.00
18	MANHOLE REPAIR-REP GRADE RING	3.00	EA	200.00	600.00
19	SERV. LATERAL CONN.-SEWER PIPE	20.00	EA	400.00	8,000.00
20	REP. 6" GRAVITY SEWER PIPE	1600.00	LF	30.00	48,000.00
21	REP. 8" GRAVITY SEWER PIPE	1170.00	LF	36.00	42,120.00
22	REP. 10" GRAVITY SEWER PIPE	280.00	LF	40.00	11,200.00

236" POINT REPAIR	2.00 EA	1200.00	2,400.00
2410" POINT REPAIR	1.00 EA	1600.00	1,600.00
258" GRAVITY SEWER PIPE	505.00 LF	36.00	18,180.00
26CLEANING 6" SEWER PIPE	1840.00 LF	4.00	7,360.00
27CLEANING 8" SEWER LINE	850.00 LF	4.00	3,400.00
28SLIPLINING 6" SEWER LINE	1840.00 LF	16.00	29,440.00
29SLIPLINING 8" SEWER LINE	850.00 LF	18.00	15,300.00
30SERVICE LAT. CONN.-SLIPLINER	20.00 EA	400.00	8,000.00
		TOTAL AMOUNT:	4,395,690.00

TELEPHONE CONVERSATION REPORT

PROJECT: Canyon W.W.T.P Improvements STUDY ITEM / NO.: 7

DATE: 10 June 92 PHONE: (303) 969-2162

FROM: Bob Sund TO: Doug Denile
Sanitation Engineer
U.S. Park service, Denver

I spoke with Doug concerning the perimeter fence around the waste water treatment plant. He said that the chain link fence is required by the state of Wyoming around all sewage treatment plants. The two foot additional fencing below grade is specified by the Park service to discourage bears from digging. The vinyl coating required by the specifications was strictly for aesthetic purposes. The main reason for requiring a heavy duty fence is to be able to withstand the winter snow loads. He was not sure why the barb wire is required unless it was for discourage bears from climbing.

By: Bob Sund

FTP
986-0425

TELEPHONE CONVERSATION REPORT

PROJECT: CANYON WASTEWATER TREATMENT STUDY ITEM / NO.: VE TEAM #7

DATE: JUNE 10, 1992 PHONE: (303) 665-2274

FROM: GREER TO: CUSTOM FENCE - DENVER
* ELCAR FENCE - DENVER

CALL #1. OBTAIN DATA ON 4' and 3' CHAIN LINK FENCE
4' - 9 GA cost $1.40/LF
[3' 6 GA cost .80/LF N/A IN 9 GA]

CALL #2 OBTAIN ADDITIONAL COST DATA (CHAIN LINK 9 GA)
6' - $2.25/LF
[8' - 2.90/LF]
10' 3.75/LF 85¢

* CALL #3 (ELCAR) TO COMPARE - NOT FRIENDLY - LESS HELPFU
COSTS WERE WITHIN 6-7 CENTS + OR -

CALL #4 TO OBTAIN COSTS OF VINYL COATING
CLERK AT LUNCH - MUST CALL BACK

CALL #5 COST DATA ON VINYL COATING

9 GA WIRE WITH VINYL	10'	4.00	W/O
10' POST 2" " "	"	25	W/O - 15
TOP RAIL " "	"	1.75	W/O 1.40
LIFE EXTENSION		NO	
AVG LABOR COSTS		$4-5/HR	
BARB WIRE/Ft		$40 Roll 1300'	

By:

FUNCTION ANALYSIS AND COST/WORTH WORKSHEET

PROJECT: CANYON WWTP IMPROVEMENTS STUDY ITEM: FENCE

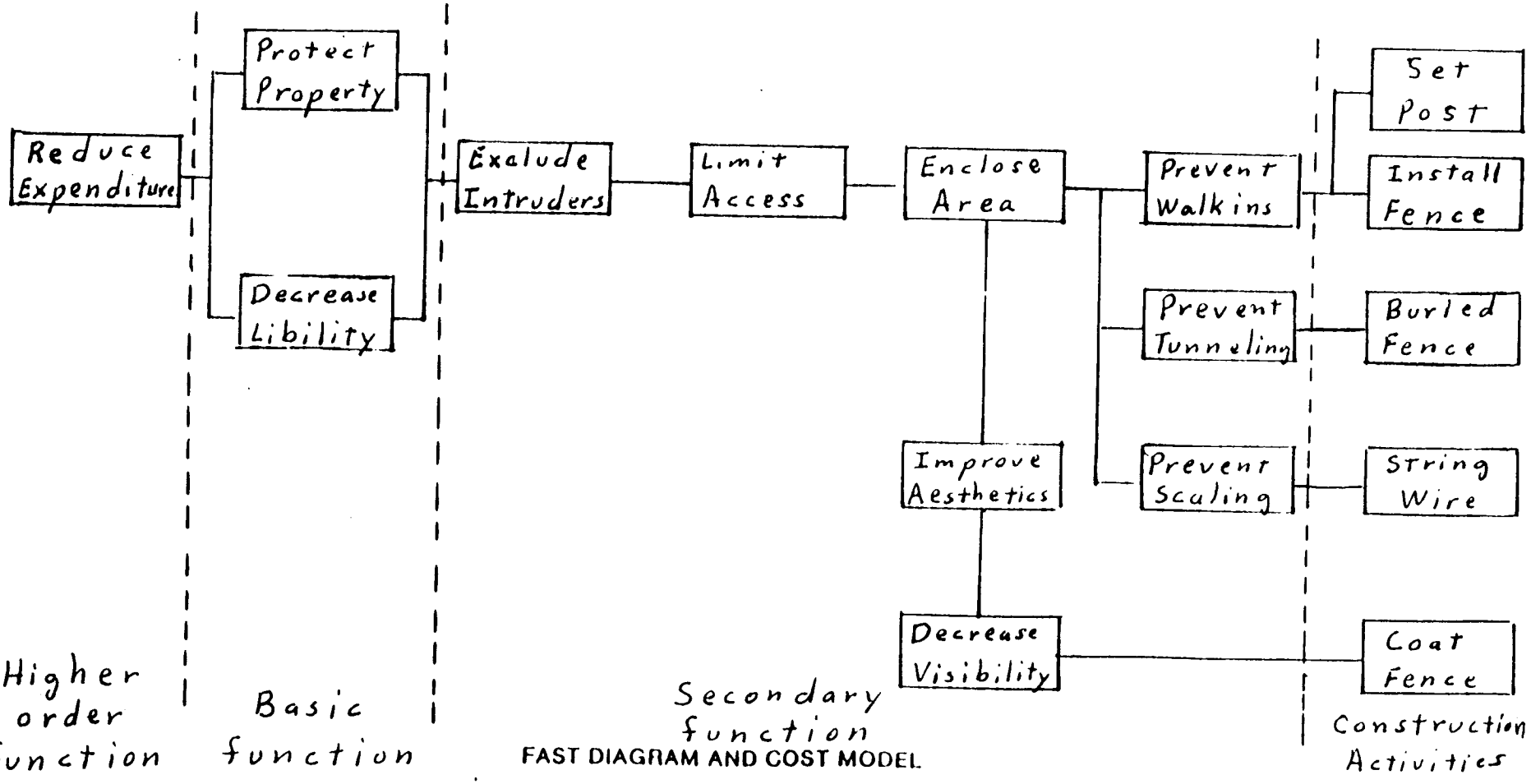
ITEM OR COMPONENT UNDER STUDY	FUNCTION(S)			PRESENT COST(S)	WORTH		V.I.
	VERB	NOUN	TYPE		INITIAL ALTERNATIVE(S)	ALTERNATIVE COST(S)	
ORIGINAL FENCE AS DESIGNED 4300 LF - ESTIMATED COST $77,000	PROTECT	PROPERTY	B	77,400	REDUCE FENCE TO 3900 FT W/MODIFICATIONS AS FOLLOWS	44,790	1.7
	DECREASE	LIABILITY					
	DEFINE	BOUNDARY					
#9 GAGE CHAIN LINK FENCE 10-FT HIGH W/2FT BURY	LIMIT	ACCESS	2ND	46,440	#9 GAGE CHAIN LINK FENCE ONLY 8-FT HIGH W/O AND 2-FT BURY	32,370	1.4
	DEFINE	BOUNDARY					
FENCE POST 10FT DEEP-POSITIONED 8FT ON CENTER- VINYL COATED ($25/POST)	SUPPORT	FENCE	2ND	13,158	FENCE POST (3900 LF) 8 FT ON CENTER, DELETE VINYL COAT ($15/POST)	7,350	
	INCREASE	STRENGTH					
VINYL CLAD ON 2-INCH MESH FOR ENVIRONMENTAL VISIBILITY	DECREASE	VISIBILITY	2ND	0	NO CHANGE	0	
	INCREASE	AESTHETICS					
FENCE BURIED 2-FT DEEP IN TRENCH. NEED TO EXCAVATE & BACKFILL	LIMITS	ACCESS	2ND	13,932	3-FT HORIZONTAL #6 GAGE, MAT, COVERED 2-4 INCH - REVEG SECURED BY POST	5,070	
	INCREASE	STRENGTH					
3 STRANDS OF BARB WIRE	DISCOURAGE	SCALING	2ND	3,870	ELIMINATE BARB WIRE	0	

NOTES: Type of Function : B = Basic, 2nd = Secondary; Present Cost (C) is From Estimate
Initial Alternative: Mini-Brainstorm; Alternative Cost (W): Lowest known cost to satisfactorily achieve the function
V.I. is Value Index (C/W); C/W < 1 = GOOD VALUE; C/W > 1 = POOR VALUE; POOR VALUE ITEMS SHOULD STUDIED!

HOW? →

Original

← WHY?

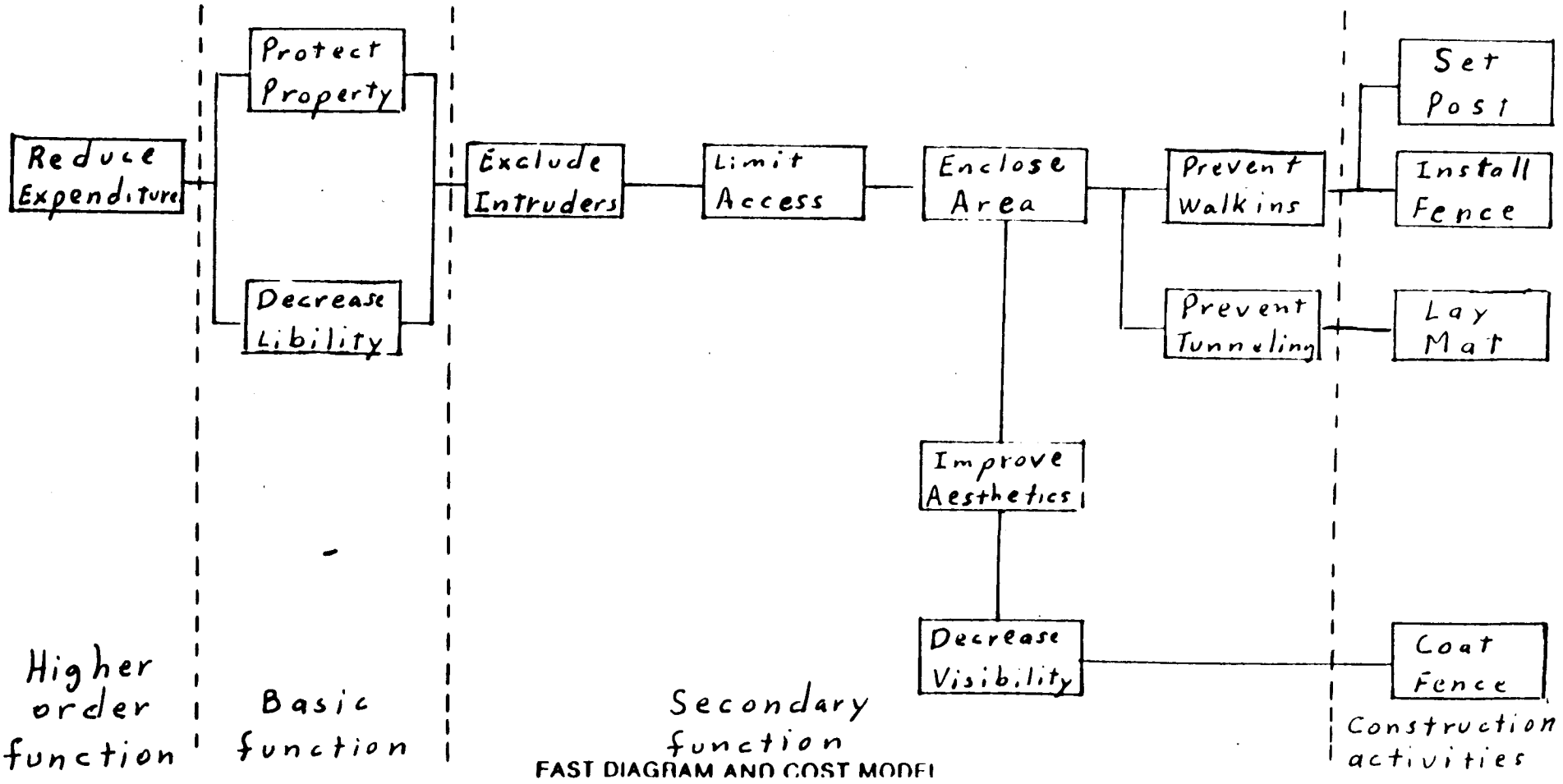


FAST DIAGRAM AND COST MODEL

V. E.

HOW? →

← WHY?



FAST DIAGRAM AND COST MODEL

SPECULATION PHASE

Applied Creativity To Generate Alternatives

FUNCTION BEING ANALYZED: FENCE PROPERTY

PROJECT: CANYON WTP IMPROVEMENTS STUDY ITEM / NO.: VE-7 \ 6-92

1. FENCE SMALLER AREA
2. CHANGE WTP PROCESS TO REDUCE NEED FOR FENCE
3. USE CONCRETE WALLS
4. STOCKADE TYPE WALL
5. ZOO MOAT TYPE EXCAVATION
6. ELECTRIC FENCE
7. LIGHTS, BELLS ALARMS
8. BEAR REPELLENT
9. SHEET METAL TO REPLACE BURIED FENCE
10. DRIVE RODS OR POSTS TO REPLACE FENCE
11. HEDGE FOR ESTHETICS
12. REDUCE GREASE BY USING FRIENDLY BAL-TERRA
13. ELIMINATE FENCE BY PUMPING WASTEWATER TO MONTANA
14. ARMED GUARDS
15.
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.

SPECULATION

CRITERIA WEIGHING PROCESS

PROJECT: Canyon W.T.P. Improvements STUDY ITEM / NO.: Fence - VE-7

CRITERIA	RAW SCORE (WEIGHT)
A. Protect the property (the wastewater treatment plant)	27
B. Keep buffalo from pushing through	9
C. Maintenance free (rust free, withstand winter)	3
D. Aesthetically pleasing	6
E. Cost	0
F. Limits access to visitors	15
G. Keep bears from getting through (includes digging under)	21
H. Ease of operations during routine operation	3

How important

4 - Major preference
3 - Medium preference
2 - Minor preference
1 - Letter/Letter - no preference each scored one point

	B	C	D	E	F	G	H
A	A4	A4	A3	A4	A4	A4	A4
B		B2	B2	B3	F2	G3	B2
C			D2	C2	F3	G4	C1 / H1
D				D2	F2	G3	D2
E					F4	G4	H2
F						G3	F4
G							G4

Note : Drop Criteria with a Raw Score of 1
(Criteria which gets dropped may be considered in Advantages/Disadvantages Analysis)

ANALYSIS

ANALYSIS MATRIX VE STUDY NO: 7

SUBJECT: Fence FUNCTION: Protect property Reduce liability

COMPONENT OF: Canyon Wastewater Treatment Plant Improvements

COST / WORTH = $77,400 / $44,790 DISCUSSION:

DESIRED CRITERIA

FUNCTION FOR STUDY: Protect property; Reduce liability — ALTERNATIVES / RELATIVE WEIGHTS	Protect the property (the wastewater treatment plant) 27	FIRST RANKING	Keep bears from getting through 21	Limits access to visitors 15	Keep buffalo from pushing through 9	Aesthetically pleasing 6	Maintenance 3	Ease of operations 3	Cost 0		TOTAL	FINAL RANKING
1 Original design	5/135		5/105	5/75	5/45	3/18	3/9	3/9			396	2
2 Revise wastewater process smaller area needed	5/135		5/105	5/75	5/45	2/12	2/6	2/6			384	
3 Concrete fence	3/81		5/105	5/75	1/9	1/6	2/6	2/6			288	
4 High-tech "sci-fi" lasers, ultrasound	2/54											
5 Pump to Gardiner, Montana	5/135		5/105	5/75	5/45	4/24	3/9	3/9			402	1
6 Fence: delete barbed wire	4/108		5/105	3/45	5/45	4/24	3/9	3/9			345	
7 Fence: 6-foot high, delete barbed wire, 10-foot post spacing	4/108		1/21	2/30	2/18	4/24	2/6	2/6			213	
8 Zoo moat	2/54											
9 Hedge with thorny brush	2/54											
10 Delete buried fence. Driven rods or posts	4/108		3/63	5/75	4/36	3/18	3/9	3/9			318	
11 Redesigned fence with horizontal base fence	5/135		5/105	5/75	5/45	3/18	3/9	3/9			396	2
12												
13												

EXCELLENT-5 VERY GOOD-4 GOOD-3 FAIR-2 POOR-1

ALTERNATIVE EVALUATION

PROJECT CANYON SEWAGE TREATMENT FACILITY STUDY ITEM VE-7

FUNCTION BEING ANALYZED FENCING (PROTECT PROPERTY)

NO.	SELECTED ALTERNATIVES	ADVANTAGES	DISADVANTAGES	IDEA RATING
1	PUMP TO MONTANA	ELIMINATES NEED FOR FENCING AESTHETICALLY PLEASING ELIMINATES NEED FOR EXISTING PLANT. SATIFIES DEQ OF WYOMING. NO OPERATION & MAINTENANCE FOR FENCING NO TREATMENT OF SEWAGE AT THE PARK	COST OF INSTALLING PIPELINE. ENVIRONMENTAL IMPACT. COST OF OPERATING AND MAINTAINING TREATMENT OF WASTE AT DISCHARGE POINT. PUMPING COST.	

ALTERNATIVE EVALUATION

PROJECT Canyon WTP Improvements STUDY ITEM VE-7

FUNCTION BEING ANALYZED Fencing (Protect Property)

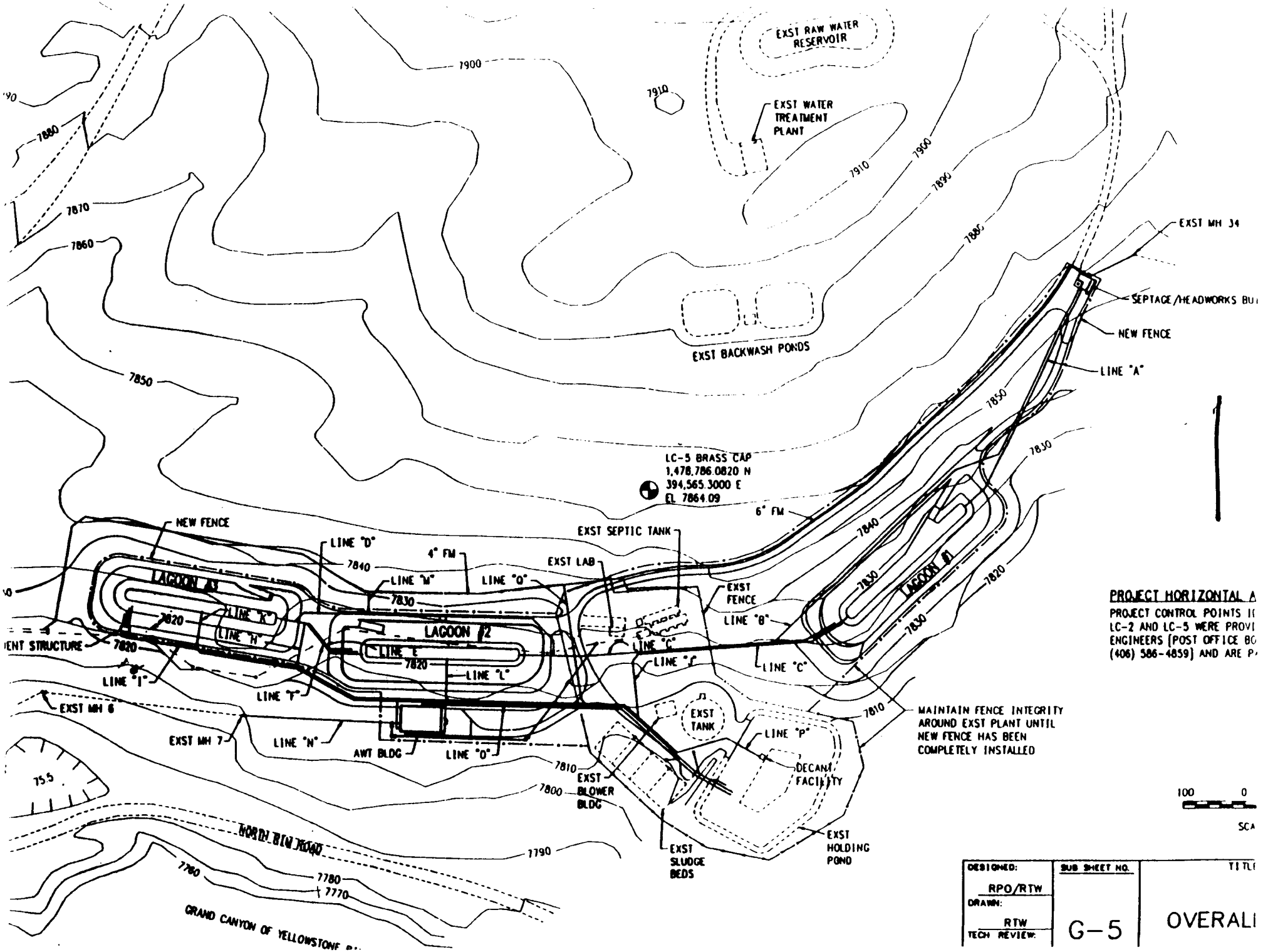
NO.	SELECTED ALTERNATIVES	ADVANTAGES	DISADVANTAGES	IDEA RATING
2.	Original design	Serves basic function Standard design criteria Low operations & maintenance Aesthetically pleasing	4300 L.F of trench 2 ft. deep required construction difficult - trenching & backfill required	

ALTERNATIVE EVALUATION

PROJECT CANYON WTP IMPROVEMENT STUDY ITEM VE-7

FUNCTION BEING ANALYZED FENCING (PROTECT PROPERTY)

NO.	SELECTED ALTERNATIVES	ADVANTAGES	DISADVANTAGES	IDEA RATING
3	MODIFY DESIGN	SERVES BASIC FUNCTIONS	PERSONNEL MOVEMENT RESTRICTED DUE TO REDUCTION IN ENCLOSED AREA.	
	INSTALL HORIZONTAL MAT	EASIER TO CONSTRUCT		
	REDUCE AREA TO ENCLOSE	DECREASED QUANTITY OF FENCING AND LESSEN INITIAL COST OUTLAY.	POSTS NOT VINYL-CLAD MAY NOT LOOK PLEASING.	



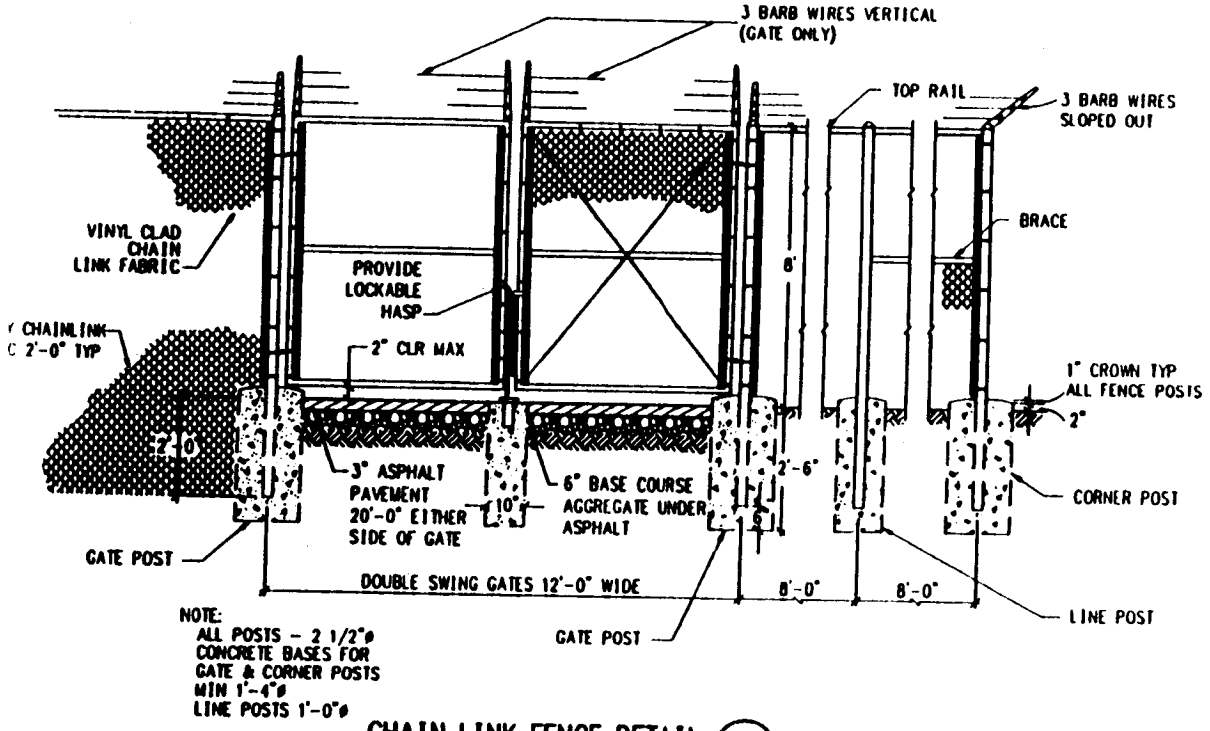
PROJECT HORIZONTAL A

PROJECT CONTROL POINTS II
LC-2 AND LC-5 WERE PROVI
ENGINEERS (POST OFFICE BO
(406) 586-4859) AND ARE P

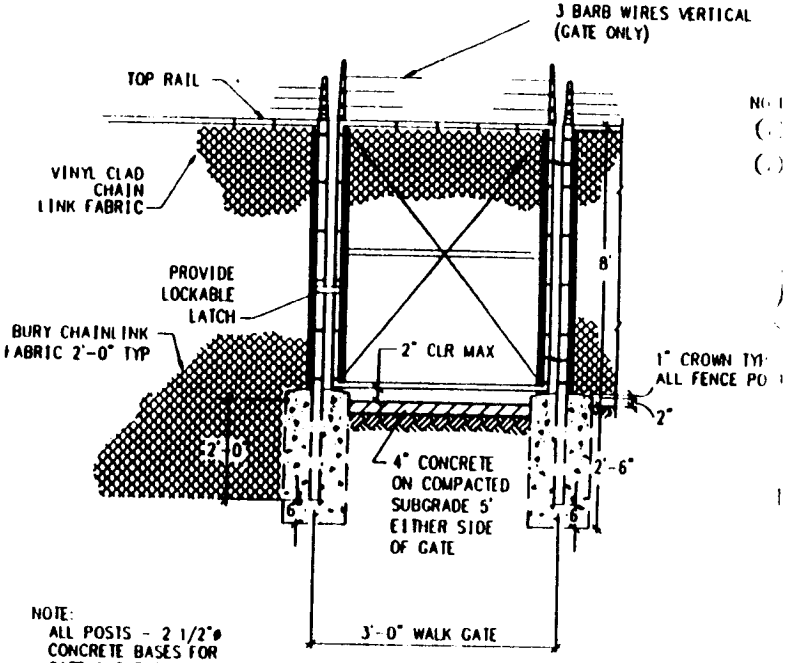
100 0

SCA

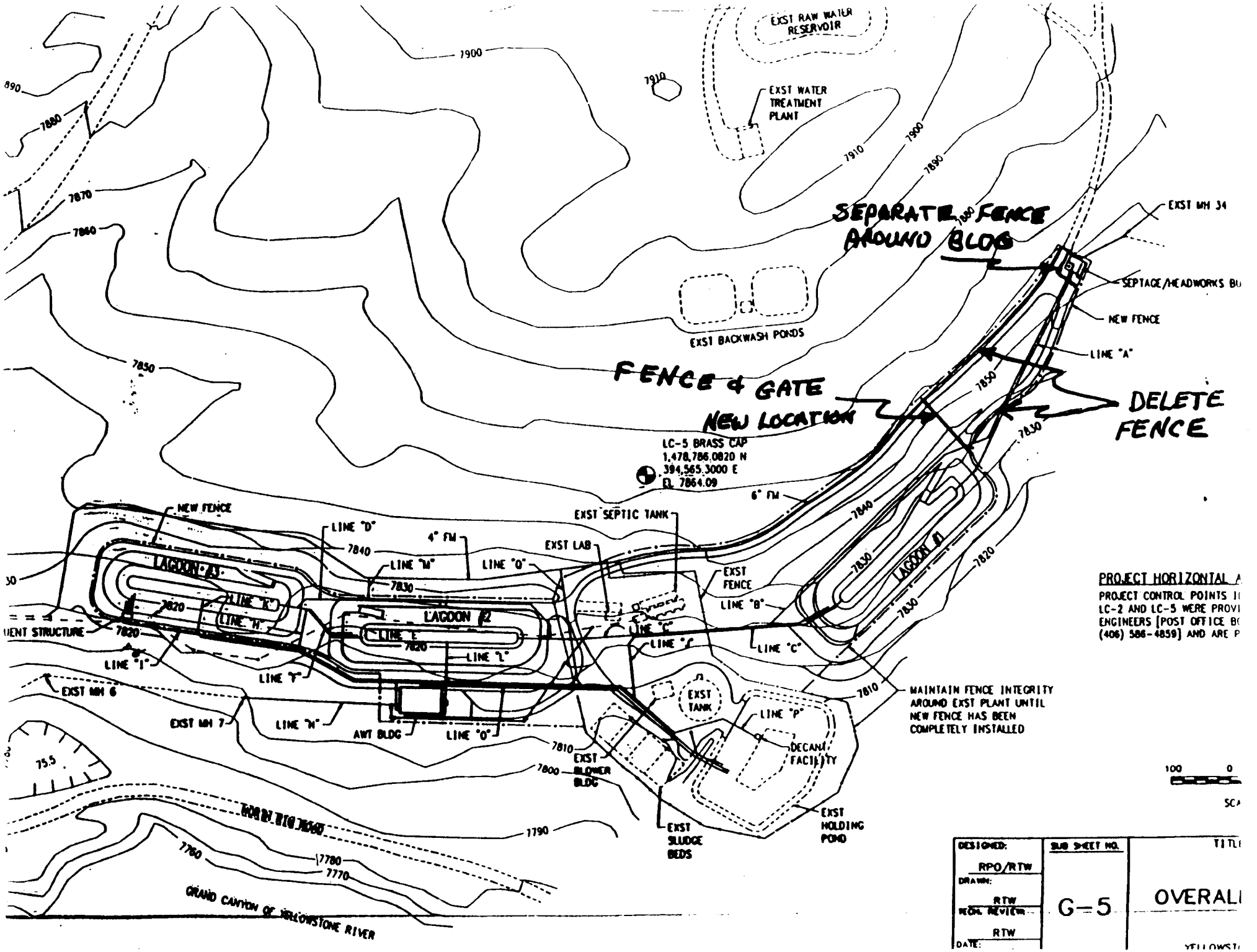
DESIGNED:	SUB SHEET NO.	TITLE
RPO/RTW		
DRAWN: RTW	G-5	OVERALL
TECH REVIEW:		



CHAIN LINK FENCE DETAIL 9 / C-4,5,6



CHAIN LINK FENCE WALK GATE 13 / C-6



PROJECT HORIZONTAL A

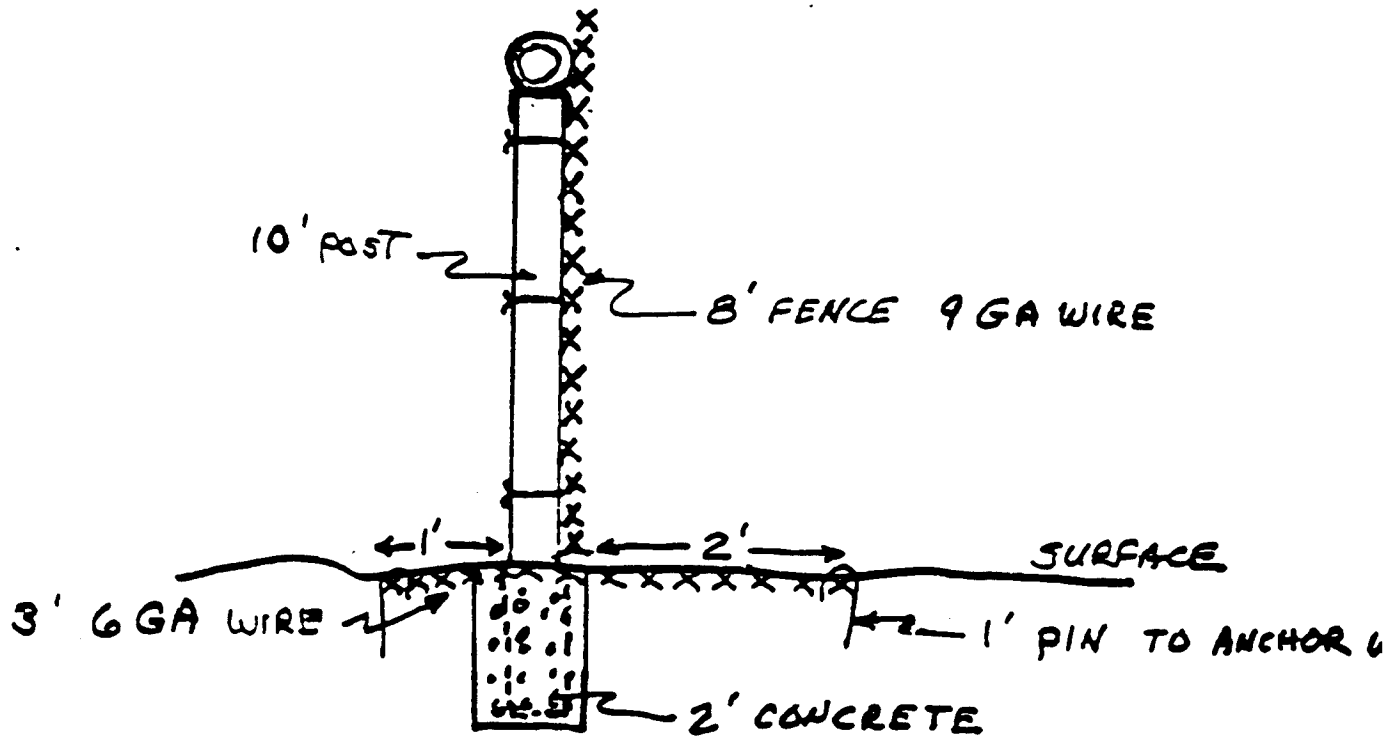
PROJECT CONTROL POINTS II
LC-2 AND LC-5 WERE PROVI
ENGINEERS [POST OFFICE B
(406) 586-4859] AND ARE P

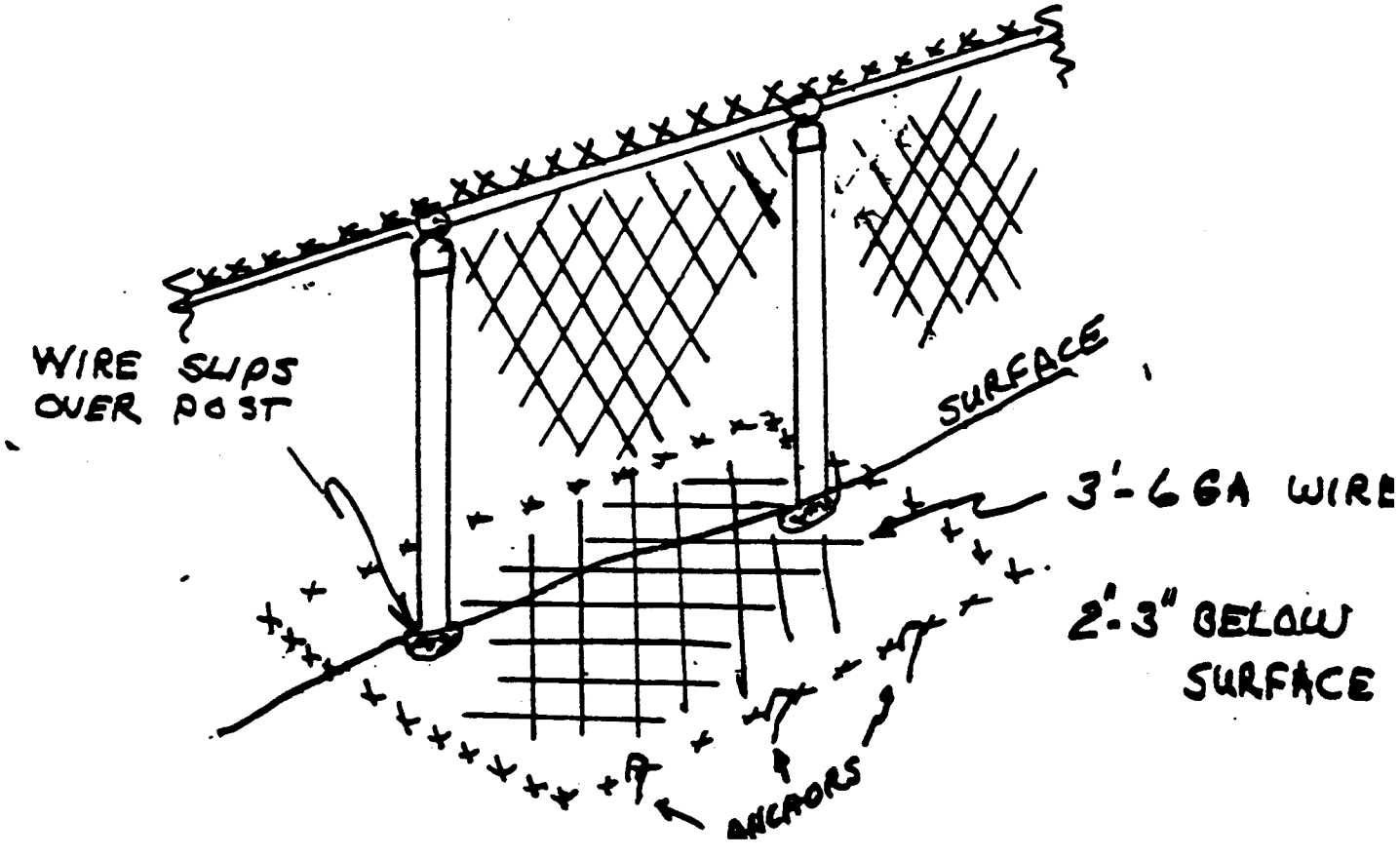
100 0

SC

DESIGNED:	SUB SHEET NO.	TITLE
RPO/RTW		
DRAWN: RTW	G-5	OVERALL
TECH. REVIEW: RTW		
DATE:		YELLOWST

CANYON VILLAGE WASTEWATER TREATMENT
FENCE ALTERNATIVE





COST ESTIMATE FORM

PROJECT: CANYON WWTP EXPANSION STUDY ITEM / NO.: VE-7 8 - FENCE

	ITEM / DESCRIPTION	QTY.	UNIT COST	TOTAL COST
1.	ORIGINAL FENCED ENCLOSURE	4300	18/FT	77,400 *
	FENCE POST 8FT ON CENTER (PVC-VINYL COATED)	540	25/POST	13,500
	FENCING MATERIAL (10 FT HIGH VINYL COATED)	4300	4.00/FT	17,200
	TOP RAIL (VINYL COATED)	4300	1.75/FT	7,525
	BARB WIRE (INSTALLED & FURNISHED)	4300	.80/FT	3,870
	LABOR TO INSTALL FENCE & POST	4300	5.00/FT	21,500
	LABOR TO EXCAVATE, SET BACKFILL	4300	3.21/FT	13,805 **
2.	VE ALTERNATE PROPOSAL	3900	11.48/FT	44,790
	FENCE POST 8FT ON CENTER (W/O VINYL)	490	15/POST	7,350
	FENCING MATERIAL (8FT HIGH VINYL COATED)	3900	2.90/FT	11,310
	TOP RAIL (W/O VINYL COATED)	3900	1.40/FT	5,460
	3FT HORIZONTAL MAT (#6 GAGE)	3900	0.80/FT	3,120
	LABOR TO INSTALL FENCE & POST	3900	4.00/FT	15,600
	LABOR TO LAY & STAKE 3FT MAT	3900	0.50/FT	1,950
	* ESTIMATED ENGINEERS ESTIMATE			
	** ONLY MONEY AVAILABLE			

ESTIMATE

LIFE - CYCLE COST ANALYSIS
Using Present Worth (PW) Costs

PROJECT : CANYON WWTP EXPANSION
STUDY ITEM / NO. : FENCE (VL 7)
25 YEAR LIFE SPAN

	ORIGINAL		ALTERNATE NO. 1		ALTERNATE NO. 2		REMARKS
	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	
COLLATERAL / INITIAL COSTS							
Base Cost	77,400		44,790				
Interface Costs							
a.							
b.							
c.							
Other Initial Costs							
a.							
b.							
TOTAL INITIAL COST IMPACT (IC)		77,400		44,790			
SALVAGE & REPLACEMENT COSTS							
Single Expenditures @ 10 Interest							8 FT SECTION REPLACED/YR 144 x 5 = 720 1.5 INCREASE FACTOR EACH 5 YEAR
1. Year 5 PW Factor .6209	720	447	276	171			
2. Year 10 PW Factor .3855	1080	416	414	160			
3. Year 15 PW Factor .2394	1620	388	621	149			
4. Year 20 PW Factor .1486	2430	361	931	138			
5. Year ____ PW Factor ____							
Salvage Present Worth 10% BASE COST	-7,740	-714	-4,480	-414			
TOTAL PRESENT WORTH .0923		898		205			ASSUME 10% SALVAGE VALUE
ANNUAL COSTS (Based on Present Worth of Annuity)							
Annual Costs @ 10 Interest 25 YEARS							
a. Maintenance							
Escal. Rate ____ PWA Factor 9.077	500	4,538	400	3,631			
b. Operations							
Escal. Rate ____ PWA Factor ____							
c. Others							
Escal. Rate ____ PWA Factor ____							
d. Others							
Escal. Rate ____ PWA Factor ____							
TOTAL ANNUAL COSTS		4,538		3,631			
TOTAL PRESENT WORTH COSTS		82,836		48,626			
LIFE CYCLE (PW) SAVINGS				34,210			

VALUE ENGINEERING PROPOSAL

PROJECT: Canyon WWTP Improvements
STUDY ITEM / NO.: 6 (Group 7)
LOCATION: Yellowstone National Park
ITEM'S FUNCTION(S): Protect Property
Decrease Liability

ORIGINAL CONCEPT	VE CONCEPT
Original concept consisted of a 10-foot high chain-link vinyl-coated fence. Fence encompassed entire WWTP area. 2 feet of fence is buried. The top of fence has 3 strands of barbed wire. This concept required 4300 feet of 2-foot deep trench excavation in rocky soil in forest in environmentally sensitive region.	The VE team's concept is to install an 8-foot high chain-link vinyl-coated fence with a 3-foot wide horizontal mat of chain-link fence buried just below the ground surface. Enclose 2 separate areas with the fence. Eliminate the barbed wire on top of fence. Eliminate vinyl coating from posts. This concept eliminates 4300 feet of trench excavation. Enclosing 2 separate areas decreases the length of fence required by 400 feet. Eliminating vinyl coating from posts saves $10. per post. The green fabric will conceal the posts. Bears will be discouraged from digging through as their paws hit the horizontal mat. Buffalo are still unable to run through. The 8-foot height discourages people from scaling the fence.

COSTS	INITIAL	LIFE CYCLE	TOTAL
ORIGINAL CONCEPT	$ 77,400	5,436	82,836
VE CONCEPT	44,790	3,836	48,626
SAVINGS	32,610	1,600	34,210
		SUBTOTAL (ROUNDED)	34,210
		IMPLEMENTATION COSTS	500
		NET SAVINGS	33,710

IMPLEMENTATION COSTS (INCLUDING REDESIGN)
Slight changes on 2 drawings. Review and change specifications paragraphs. Issue amendment.

SECTION F - Training Support

SECTION F - VE Training Support

1. Introduction. The Value Engineering training program is an extremely important segment of the successful implementation and continuation of a VE program.

2. Instructors. The quality of instruction depends upon the knowledge, experience, creative ability, technical competence, knowledge of the total VE process and principles, and the talent to transfer that knowledge and inspire people to adopt it in practice. Select instructors that have backgrounds and technical expertise that matches the types of projects and programs to which VE will be applied.

3. Forty-hour VE Training Workshop Projects.

a. Study Items. Select projects for study that are large enough to challenge a team. A very large project can be broken into segments to be divided by several teams. Have two or three extra projects on hand in the event the proper skills are not available from the student body to address some projects.

b. Information Required. Each study item should have complete and current plans, specifications and cost estimates, plus design documents, review comments, and lists of persons to contact for information with telephone numbers for each. The submitting office should indicate areas it recommends for study. The project can be helped and kept on schedule by identifying significant problems for additional input from the VE workshop.

c. Meeting Room. Obtain a room that has enough size, lighting, HVAC control, and acoustics to provide a comfortable environment for learning. Assure access to the room for the entire period of training. A suggested room layout for the 40-hour workshop is provided. Seminars

should have writing space for each student, but may be arranged in a more compact style. The rooms should be set up the evening before the training session, materials put at each student's place, and equipment tested for workability.

d. Equipment and Supplies. The following materials should be available for the 40-hour VE training workshop:

Vue-graph projector
35mm KODAK Carousel projector with three (3) 80-slot trays (140-slot tray is too thin to accept plastic framed slides)
Blackboard, chalk, eraser
Movie screen - large
Reproduction/copy machine
Two (2) boxes of transparency material
Telephones, two (2) minimum
Local telephone directory
Means Estimating books, two (2) sets
Note pads; 8-1/2 x 11 inches, one for each five (5) students
Tracing paper; 8-1/2 x 11 inches, one for each five (5) students
Felt marking pens eight (8), for nameplates and FAST diagrams, 1/4 inch wide tips (Big print)
Transparency marking pens (color fast) One (1) set pencils, at least one (1) per student
Pencil sharpener
Scotch tape and dispensers, three (3) minimum
3 x 5 inch cards, 100 for each five (5) students
Flip chart pads, two (2), No stand
Graph paper, two (2) tablets
Stapler, three (3) and staples
Three-hole punch
Extension cord, two (2)
Paper clips, one (1) box
Staple remover, three (3)

Scales, engineer, six (6); architect, three (3)
Triangles, 30-60 degrees, three (3)
Scissors
Reinforcing tape, one (1) roll

Students need to bring a pocket-size calculator for Life Cycle Cost exercises.

SECTION G - References

Purpose. The following references are enclosed for convenience.

1. OMB Circular No. A-131, Value Engineering
2. FAR Parts 48 and 52.248-1, Value Engineering
3. DIAR Part 1448, Value Engineering
4. Departmental Manual-Value Engineering/Analysis (369 DM 1)

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON D.C. 20503

January 26, 1988

CIRCULAR NO. A-131

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Value Engineering

1. Purpose. The purpose of this Circular is to require the use of value engineering, as appropriate, by Federal Departments and agencies to identify and reduce nonessential procurement and program costs. The Circular requires agency heads to establish and improve their use of value engineering programs.

2. Background. Value engineering in the Federal Government is a means for some Federal contractors and Government entities to change the plans, designs and specifications for Federal programs and projects. These changes are intended to lower the Government's costs for goods and services and maintain necessary quality levels.

a. Prior Reports. Over the last several years, reports issued by the General Accounting Office (GAO) and many Inspectors Generals (IGs) have consistently concluded that greater use of value engineering would result in substantial savings to the Government. While some Federal agencies have value engineering programs, other agencies have not utilized value engineering fully. Even for agencies with established programs, the GAO and IG reports conclude that much more can and should be done to realize the benefits of value engineering.

b. Identified Impediments. The impediments that are frequently noted in these reports and that have prevented a greater use of value engineering include:

(1) Failure of senior management to allocate the necessary resources, both in effort and in funds, to establish and run value engineering programs;

(2) Absence of good criteria for selecting projects and programs for value engineering studies;

(3) Failure to properly perform value engineering studies;

(4) Inadequate attention by agency management to reviewing and implementing the recommendations made in value engineering studies.

c. Other Problems. Many of the problems noted in the GAO and IG reports are attitudinal. A common observation in many of the reports is that there are few incentives to use value engineering or other cost cutting techniques to save money on fully funded Federal programs and projects. Obviously, programs should be developed, critically reviewed and administered in the most cost effective manner possible. Value engineering and other management techniques must ensure realistic project budgets and identify and remove nonessential capital and operating costs.

3. Definitions.

a. Agency. As used in this Circular, the term "agency" means any executive department, military department, government corporation, government controlled corporation or other establishment of the executive branch of the Federal government.

b. Value Engineering. An organized effort directed by a person trained in value engineering techniques to analyze the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with required performance, reliability, quality and safety.

c. Value Engineering Change Proposal (VECP). A change proposal that is submitted by a contractor under a value engineering incentive or program requirement clause included in a Federal contract.

d. Value Engineering Proposal. A change proposal developed by employees of the Federal Government or contractor value engineering personnel employed by the agency to provide value engineering services for the contract or program.

4. Policy. Agencies shall establish value engineering programs and use value engineering, where appropriate, to reduce nonessential costs and improve productivity. Value

engineering programs of agencies shall, at a minimum, provide for the following management and procurement practices.

a. Management Practices. Value engineering programs must be tailored to the mission and organizational structure of each agency. For example, the cost and program/project size usually indicate the potential for value engineering. In most agencies, a relatively few programs or projects comprise the majority of costs and value engineering efforts should be concentrated on these programs and projects. Therefore, agencies shall:

(1) Emphasize, through training, evaluation and other programs, the potential of value engineering to reduce unnecessary costs.

(2) Establish a single entity within the agency to manage and monitor value engineering efforts, encourage the use of value engineering and maintain data on the program. This function shall achieve the purposes of this circular. Value engineering training shall be provided to the person responsible for the value engineering function and to other personnel responsible for developing, reviewing and analyzing value engineering actions.

(3) Report and update the name, address and telephone number of the person responsible for each agency's value engineering program to the Office of Federal Procurement Policy, Office of Management and Budget.

(4) Ensure that funds necessary for operating agency value engineering programs are included in annual budget requests, and provide annual summary value engineering program information to the Office of Management and Budget as requested.

(5) Establish criteria and guidelines to identify those programs and projects that are most appropriate for value engineering studies. The criteria and guidelines should recognize that the potential savings are generally greatest during the planning, design, and other early phases of project/program development.

(6) Require that files be documented to explain why value engineering studies were not performed or required for any programs/ projects meeting the agency criteria.

(7) Establish guidelines to evaluate and process value engineering proposals.

b. Procurement Practices. Present procurement policies and practices for the use of value engineering are set forth in Parts 48 and 52 of the Federal Acquisition Regulation (FAR). Part 48 provides two basic incentive approaches for using value engineering. The first approach uses a Value Engineering Incentive (VEI) clause. In this approach the contractor's participation is voluntary and the contractor uses its resources to develop and submit VECPs. A contract clause provides that when a VECP is accepted any resulting savings are shared with the contractor on a preestablished - usually a percentage - basis set forth in the contract.

The second approach, uses a Value Engineering Program Requirement (VEPR) clause and requires the contractor to conduct a specific value engineering effort within the contract, i.e., an effort to identify and submit to the Government methods for performing more economically. In this second approach, the contractor also shares in any savings resulting from the VECP, but at a lower percentage rate than under the voluntary approach. This effort generally is directed at the major cost items of a system or project.

The FAR presently permits agency heads to exempt their agencies from using value engineering provisions in contracts. The authority to totally exempt agencies from using value engineering provisions will be rescinded and the FAR will be modified to require that contracting activities include value engineering provisions in contracts except where exemptions are granted on a case-by-case basis or for specific classes of contracts. One time agency-wide exemptions will no longer be permitted. In addition, agency contracting activities will:

(1) Actively elicit VECPs from contractors.

(2) Promote value engineering through contractor meetings and the dissemination of promotional

and informational literature regarding the value engineering provisions of contracts.

(3) Establish guidelines for processing value engineering change proposals and require that contract files list all change proposals requiring more than 45 days to accept or reject.

(4) Document all contract files to explain the rationale for accepting or rejecting value engineering change proposals.

(5) Use the value engineering clauses provided in the FAR for appropriate supply, service, architect-engineer and construction contracts.

(6) Use the value engineering program requirement clause (FAR 52.248-1 alternatives I or II) in initial production contracts for major systems programs and for contracts for research and development except where the controlling program officer determines and documents the file to reflect that such use is not appropriate (see Section 4 of Public Law 93-400, as amended (41 U.S.C. 403) for definitions of major systems).

5. Sunset Review. The policies contained in this Circular will be reviewed by the Office of Management and Budget three years from the date of issuance.

6. Inquiries. Further information about this Circular may be obtained by contacting the Office of Federal Procurement Policy, 726 Jackson Place, NW, Washington, DC 20503, Telephone (202) 395-6803.

James [illegible] III
Director

PART 48

VALUE ENGINEERING

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PART 48

VALUE ENGINEERING

48.000 Scope of part.

This part prescribes policies and procedures for using and administering value engineering techniques in contracts.

48.001 Definitions.

"Acquisition savings," as used in this part, means savings resulting from the application of a value engineering change proposal (VECP) to contracts awarded by the same contracting office or its successor for essentially the same unit. Acquisition savings include—

(a) Instant contract savings, which are the net cost reductions on the contract under which the VECP is submitted and accepted, and which are equal to the instant unit cost reduction multiplied by the number of instant contract units affected by the VECP, less the contractor's allowable development and implementation costs;

(b) Concurrent contract savings, which are net reductions in the prices of other contracts that are definitized and ongoing at the time the VECP is accepted; and

(c) Future contract savings, which are the product of the future unit cost reduction multiplied by the number of future contract units scheduled for delivery during the sharing period (but see 48.102(g)). If the instant contract is a multiyear contract, future contract savings include savings on quantities funded after VECP acceptance.

"Collateral costs," as used in this part, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this part, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contracting office," as used in this part, includes any contracting office that the acquisition is transferred to, such as another branch of the agency or another agency's office that is performing a joint acquisition action.

"Contractor's development and implementation costs," as used in this part, means those costs the contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Future unit cost reduction," as used in this part, means the instant unit cost reduction adjusted as the contracting officer considers necessary for projected learning or changes in quantity during the sharing period. It is calculated at the time the VECP is accepted and applies either (a) throughout the sharing period, unless the contracting officer decides that recalculation is necessary because conditions are significantly different from those previously anticipated, or (b) to the calculation of a lump-sum payment, which cannot later be revised.

"Government costs," as used in this part, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistics support. The term does not include the normal administrative costs of processing the VECP or any increase in instant contract cost or price resulting from negative instant contract savings.

"Instant contract," as used in this part, means the contract under which the VECP is submitted. It does not include increases in quantities after acceptance of the VECP that are due to contract modifications, exercise of options, or additional orders. If the contract is a multiyear contract, the term does not include quantities funded after VECP acceptance. In a fixed-price contract with prospective price redetermination, the term refers to the period for which firm prices have been established.

"Instant unit cost reduction" means the amount of the decrease in unit cost of performance (without deducting any contractor's development or implementation costs) resulting from using the VECP on the instant contract. In service contracts, the instant unit cost reduction is normally equal to the number of hours per line-item task saved by using the VECP on the instant contract, multiplied by the appropriate contract labor rate.

"Negative instant contract savings" means the increase in the instant contract cost or price when the acceptance of a VECP results in an excess of the contractor's allowable development and implementation costs over the product of the instant unit cost reduction multiplied by the number of instant contract units affected.

"Net acquisition savings" means total acquisition savings, including instant, concurrent, and future contract savings, less Government costs.

"Sharing base," as used in this part, means the number of affected end items on contracts of the contracting office accepting the VECP.

"Sharing period," as used in this part, means the period

beginning with acceptance of the first unit incorporating the VECP and ending at the later of (a) 3 years after the first unit affected by the VECP is accepted or, (b) the last scheduled delivery date of an item affected by the VECP under the instant contract delivery schedule in effect at the time the VECP is accepted (but see 48.102(g)).

"Unit," as used in this part, means the item or task to which the contracting officer and the contractor agree the VECP applies.

"Value engineering," as used in this part, means an organized effort to analyze the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with required performance, reliability, quality, and safety.

"Value engineering change proposal (VECP)" means a proposal that—

(a) Requires a change to the instant contract to implement; and

(b) Results in reducing the overall projected cost to the agency without impairing essential functions or characteristics; *provided,* that it does not involve a change—

(1) In deliverable end item quantities only;

(2) In research and development (R&D) items or R&D test quantities that are due solely to results of previous testing under the instant contract; or

(3) To the contract type only.

"Value engineering proposal," as used in this part, means, in connection with an A-E contract, a change proposal developed by employees of the Federal Government or contractor value engineering personnel under contract to an agency to provide value engineering services for the contract or program.

SUBPART 48.1—POLICIES AND PROCEDURES

48.101 General.

(a) Value engineering is the formal technique by which contractors may (1) voluntarily suggest methods for performing more economically and share in any resulting savings or (2) be required to establish a program to identify and submit to the Government methods for performing more economically. Value engineering attempts to eliminate, without impairing essential functions or characteristics, anything that increases acquisition, operation, or support costs.

(b) There are two value engineering approaches:

(1) The first is an incentive approach in which contractor participation is voluntary and the contractor uses its own resources to develop and submit any value engineering change proposals (VECP's). The contract provides for sharing of savings and for payment of the contractor's allowable development and implementation costs only if a VECP is accepted. This voluntary approach should not in itself increase costs to the Government.

(2) The second approach is a mandatory program in which the Government requires and pays for a specific value engineering program effort. The contractor must perform value engineering of the scope and level of effort required by the Government's program plan and included as a separately priced item of work in the contract Schedule. No value engineering sharing is permitted in architect engineer contracts. All other contracts with a program clause share in savings on accepted VECP's, but at a lower percentage rate than under the voluntary approach. The objective of this value engineering program requirement is to ensure that the contractor's value engineering effort is applied to areas of the contract that offer opportunities for considerable savings consistent with the functional requirements of the end item of the contract.

48.102 Policies.

(a) Agencies shall provide contractors a substantial financial incentive to develop and submit VECP's. Contracting activities will include value engineering provisions in appropriate supply, service, architect-engineer and construction contracts as prescribed by 48.201 and 48.202 except where exemptions are granted on a case-by-case basis, or for specific classes of contracts, by the agency head.

(b) Agencies shall (1) establish guidelines for processing VECP's, (2) process VECP's objectively and expeditiously, and (3) provide contractors a fair share of the savings on accepted VECP's.

(c) Agencies shall consider requiring incorporation of value engineering clauses in appropriate subcontracts.

(d)(1) Agencies other than the Department of Defense shall use the value engineering program requirement clause (52.248-1, Alternates I or II) in initial production contracts for major system programs (see definition of major system in 34.001) and for contracts for major systems research and development except where the contracting officer determines and documents the file to reflect that such use is not appropriate.

(2) In Department of Defense contracts, the VE program requirement clause (52.248-1, Alternates I or II), shall be placed in initial production solicitations and contracts (first and second production buys) for major system acquisition programs as defined in DoD Directive 5000.1, except as specified in subdivisions (d)(2)(i) and (ii) of this section. A program requirement clause may be included in initial production contracts for less than major systems acquisition programs if there is a potential for savings. The contracting officer is not required to include a program requirement clause in initial production contracts—

(i) Where, in the judgment of the contracting officer, the prime contractor has demonstrated an effective VE program during either earlier program

phases, or during other recent comparable production contracts.

(ii) Which are awarded on the basis of competition.

(e) Value engineering incentive payments do not constitute profit or fee within the limitations imposed by 10 U.S.C. 2306(d) and 41 U.S.C. 254(b) (see 15.903(d)).

(f) Generally, profit or fee on the instant contract should not be adjusted downward as a result of acceptance of a VECP. Profit or fee shall be excluded when calculating instant or future contract savings.

(g) In the case of contracts for items requiring an extended period of production (e.g., ship construction, major system acquisition), agencies may prescribe sharing of future contract savings on all future contract units to be delivered under contracts awarded for essentially the same item during the sharing period, even if the scheduled delivery date is outside the sharing period. For engineering-development and low-rate-initial-production contracts, the future sharing shall be on scheduled deliveries equal in number to the quantity required over the highest 36 consecutive months of planned production, based on planning or production documentation at the time the VECP is accepted.

(h) In the case of contracts for architect-engineer services, the contract shall include a separately priced line item for mandatory value engineering of the scope and level of effort required in the statement of work. The objective is to ensure that value engineering effort is applied to specified areas of the contract that offer opportunities for significant savings to the Government. There shall be no sharing of value engineering savings in contracts for architect-engineer services.

(i) Agencies shall establish procedures for funding and payment of the contractor's share of collateral savings and future contract savings.

48.103 Processing value engineering change proposals.

(a) Instructions to the contractor for preparing a VECP and submitting it to the Government are included in paragraphs (c) and (d) of the value engineering clauses prescribed in Subpart 48.2. Upon receiving a VECP, the contracting officer or other designated official shall promptly process and objectively evaluate the VECP in accordance with agency procedures and shall document the contract file with the rationale for accepting or rejecting the VECP.

(b) The contracting officer is responsible for accepting or rejecting the VECP within 45 days from its receipt by the Government. If the Government will need more time to evaluate the VECP, the contracting officer shall notify the contractor promptly in writing, giving the reasons and the anticipated decision date. The contractor may withdraw, in whole or in part, any VECP not accepted by the Government within the period specified in the VECP. Any VECP may be approved, in whole or in part, by a contract modification incorporating the VECP. Until the effective date of the contract modification, the contractor shall perform in accordance with the existing contract. If the Government accepts the VECP, but properly rejects units subsequently delivered or does not receive units on which a savings share was paid, the contractor shall reimburse the Government for the proportionate share of these payments. If the VECP is not accepted, the contracting officer shall provide the contractor with prompt written notification, explaining the reasons for rejection.

(c) The following Government decisions are not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613):

(1) The decision to accept or reject a VECP.

(2) The determination of collateral costs or collateral savings.

(3) The decision as to which of the sharing rates applies when Alternate II of the clause at 52.248-1, Value Engineering, is used.

48.104 Sharing arrangements.

48.104-1 Sharing acquisition savings.

(a) *Supply or service contracts.* (1) The sharing base for acquisition savings is normally the number of affected end items on contracts of the contracting office accepting the VECP. The sharing rates (Government/contractor) for net acquisition savings for supplies and services are based on the type of contract, the value engineering clause or alternate used, and the type of savings, as follows:

GOVERNMENT/CONTRACTOR SHARES OF NET ACQUISITION SAVINGS
(figures in percent)

Contract Type	Sharing Arrangement			
	Incentive (voluntary)		Program requirement (mandatory)	
	Instant contract rate	Concurrent and future rate	Instant contract rate	Concurrent and future contract rate
Fixed-price (other than incentive)	50/50	50/50	75/25	75/25
Incentive (fixed-price or cost)	*	50/50	*	75/25
Cost-reimbursement (other than incentive)**	75/25	75/25	85/15	85/15

*Same sharing arrangement as the contract's profit or fee adjustment formula.

**Includes cost-plus-award-fee contracts.

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(2) Acquisition savings may be realized on the instant contract, concurrent contracts, and future contracts. The contractor is entitled to a percentage share (see subparagraph (1) above) of any net acquisition savings. Net acquisition savings result when the total of acquisition savings becomes greater than the total of Government costs and any negative instant contract savings. This may occur on the instant contract or it may not occur until reductions have been negotiated on concurrent contracts or until future contract savings are calculated, either through lump-sum payment or as each future contract is awarded.

(i) When the instant contract is not an incentive contract, the contractor's share of new acquisition savings is calculated and paid each time such savings are realized. This may occur once, several times, or, in rare cases, not at all.

(ii) When the instant contract is an incentive contract, the contractor shares in instant contract savings through the contract's incentive structure. In calculating acquisition savings under incentive contracts, the contracting officer shall add any negative instant contract savings to the target cost or to the target price and ceiling price and then offset these negative instant contract savings and any Government costs against concurrent and future contract savings.

(3) The contractor shares in the savings on all affected units scheduled for delivery during the sharing period (but see 48.102(g)). The contractor is responsible for maintaining, for 3 years after final payment on the contract under which the VECP was accepted, records adequate to identify the first delivered unit incorporating the applicable VECP.

(4) Contractor shares of savings are paid through the contract under which the VECP was accepted. On incentive contracts, the contractor's share of concurrent and future contract savings and of collateral savings shall be paid as a separate firm-fixed-price contract line item on the instant contract.

(5) Within 3 months after concurrent contracts have been modified to reflect price reductions attributable to use of the VECP, the contracting officer shall modify the instant contract to provide the contractor's share of savings.

(6) The contractor's share of future contract savings may be paid as subsequent contracts are awarded or in a lump-sum payment at the time the VECP is accepted. The lump-sum method may be used only if the contracting officer has established that this is the best way to proceed and the contractor agrees. The contracting officer ordinarily shall make calculations as future contracts are awarded and, within 3 months after award, modify the instant contract to provide the contractor's share of the savings. For future contract savings calculated under the optional lump-sum method, the sharing base is an estimate of the number of items that the contracting officer will purchase for delivery during the sharing period. In deciding whether or not to use the more convenient lump-sum method for an individual VECP, the contracting officer shall consider—

(i) The accuracy with which the number of items to be delivered during the sharing period can be estimated and the probability of actual production of the projected quantity;

(ii) The availability of funds for a lump-sum payment; and

(iii) The administrative expense of amending the instant contract as future contracts are awarded.

(b) *Construction contracts.* Sharing on construction contracts applies only to savings on the instant contract and to collateral savings. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (1) 45 percent for fixed-price contracts or (2) 75 percent for cost-reimbursement contracts. Value engineering sharing does not apply to incentive construction contracts.

(c) *Architect-engineering contracts.* There shall be no sharing of value engineering savings in contracts for architect-engineer services.

48.104-2 Sharing collateral savings.

(a) The Government shares collateral savings with the contractor, unless the head of the contracting activity has determined that the cost of calculating and tracking collateral savings will exceed the benefits to be derived (see 48.201(e)).

(b) The contractor's share of collateral savings is 20 percent of the estimated savings to be realized during an average year of use but shall not exceed (1) the contract's firm-fixed-price, target price, target cost, or estimated cost, at the time the VECP is accepted, or (2) $100,000, whichever is greater. In determining collateral savings, the contracting officer shall consider any degradation of performance, service life, or capability. (See 48.104-1(a)(4) for payment of collateral savings through the instant contract.)

48.104-3 Sharing alternative—no-cost settlement method.

To minimize the administrative costs for both parties when there is a known continuing requirement for the unit, consideration should be given to the settlement of a VECP submitted against the VE Incentive clause of the contract at no cost to either party. Under this method of settlement, the contractor would keep all of the savings on the instant contract, and all savings on its concurrent contracts only. The Government would keep all savings resulting from concurrent contracts placed on other sources, savings from all future contracts, and all collateral savings. Use of this method must be by mutual agreement of both parties for individual VECP's.

48.105 Relationship to other incentives.

Contractors should be offered the fullest possible range of motivation, yet the benefits of an accepted VECP should not be rewarded both as value engineering shares and under performance, design-to-cost, or similar incentives of the contract. To that end, when performance, design-to-cost, or similar targets are set and incentivized, the targets of such incentives affected by the VECP are not to be adjusted because of the acceptance of the VECP. Only those benefits of an accepted VECP not rewardable under other incentives are rewarded under a value engineering clause.

SUBPART 48.2—CONTRACT CLAUSES

48.201 Clauses for supply or service contracts.

(a) *General.* The contracting officer shall insert a value engineering clause in solicitations and contracts when the contract amount is expected to be $100,000 or more, except as specified in subparagraphs (1) through (5) and in paragraph (f) below. A value engineering clause may be included in contracts of lesser value if the contracting officer sees a potential for significant savings. Unless the chief of the contracting office authorizes its inclusion, the contracting officer shall *not* include a value engineering clause in solicitations and contracts—

(1) For research and development other than full-scale development;

(2) For engineering services from not-for-profit or nonprofit organizations;

(3) For personal services (see Subpart 37.1);

(4) Providing for product or component improvement, unless the value engineering incentive application is restricted to areas not covered by provisions for product or component improvement;

(5) For commercial products (see Part 11) that do not involve packaging specifications or other special requirements or specifications; or

(6) When the agency head has exempted the contract (or a class of contracts) from the requirements of this Part 48.

(b) *Value engineering incentive.* To provide a value engineering incentive, the contracting officer shall insert the clause at 52.248-1, Value Engineering, in solicitations and contracts except as provided in paragraph (a) above (but see subparagraph (e)(1) below).

(c) *Value engineering program requirement.* (1) If a mandatory value engineering effort is appropriate (i.e., if the contracting officer considers that substantial savings to the Government may result from a sustained value engineering effort of a specified level), the contracting officer shall use the clause with its Alternate I (but see subparagraph (e)(2) below).

(2) The value engineering program requirement may be specified by the Government in the solicitation or, in the case of negotiated contracting, proposed by the contractor as part of its offer and included as a subject for negotiation. The program requirement shall be shown as a separately priced line item in the contract Schedule.

(d) *Value engineering incentive and program requirement.* (1) If both a value engineering incentive and a mandatory program requirement are appropriate, the contracting officer shall use the clause with its Alternate II (but see subparagraph (e)(3) below).

(2) The contract shall restrict the value engineering program requirement to well-defined areas of performance designated by line item in the contract Schedule. Alternate II applies a value engineering program to the specified areas and a value engineering incentive to the remaining areas of the contract.

(e) *Collateral savings computation not cost-effective.* If the head of the contracting activity determines for a contract or class of contracts that the cost of computing and tracking collateral savings will exceed the benefits to be derived, the contracting officer shall use the clause with its—

(1) Alternate III if a value engineering incentive is involved;

(2) Alternate III and Alternate I if a value engineering program requirement is involved; or

(3) Alternate III and Alternate II if *both* an incentive and a program requirement are involved.

(f) *Architect-engineer contracts.* The contracting officer shall insert the clause at 52.248-2, Value Engineering—Architect-Engineer, in solicitations and contracts whenever the Government requires and pays for a specific value engineering effort in architect-engineer contracts. The clause at 52.248-1, Value Engineering, shall not be used in solicitations and contracts for architect-engineer services.

48.202 Clause for construction contracts.

The contracting officer shall insert the clause at 52.248-3, Value Engineering—Construction, in construction solicitations and contracts when the contract amount is estimated to be $100,000 or more, unless an incentive contract is contemplated. The contracting officer may include the clause in contracts of lesser value if the contracting officer sees a potential for significant savings. The contracting officer shall not include the clause in incentive-type construction contracts. If the head of the contracting activity determines that the cost of computing and tracking collateral savings for a contract will exceed the benefits to be derived, the contracting officer shall use the clause with its Alternate I.

origin freight shipments which do not have a security classification shall move on prepaid commercial bills of lading or other shipping documents to domestic destinations, including air and water terminals. Weight of individual shipments shall be governed by carrier restrictions but shall not exceed 150 pounds by any form of commercial air or 1,000 pounds by other commercial carriers. The Government will reimburse the Contractor for reasonable freight charges.

(b) The Contractor shall annotate the commercial bill of lading as required by the clause of this contract entitled "Commercial Bill of Lading Notations."

(c) The Contractor shall consolidate prepaid shipments in accordance with procedures established by the cognizant transportation office. The Contractor is authorized to combine Government prepaid shipments with the Contractor's commercial shipments for delivery to one or more consignees and the Government will reimburse its pro rata share of the total freight costs. The Contractor shall provide a copy of the commercial bill of lading promptly to each consignee. Quantities shall not be divided into mailable lots for the purpose of avoiding movement by other modes of transportation.

(d) Transportation charges will be billed as a separate item on the invoice for each shipment made. A copy of the pertinent bill of lading, shipment receipt, or freight bill shall accompany the invoice unless otherwise specified in the contract.

(e) Loss and damage claims will be processed by the Government.

(End of clause)

52.248-1 Value Engineering.

As prescribed in 48.201, insert the following clause in supply or service contracts to provide a value engineering incentive under the conditions specified in 48.201. In solicitations and contracts for items requiring an extended period for production (e.g., ship construction, major system acquisition), if agency procedures prescribe sharing of future contract savings on all units to be delivered under contracts awarded during the sharing period, the contracting officer shall modify subdivision (i)(3)(i) and the first sentence under subparagraph (3) of the definition of acquisition savings by substituting "under contracts awarded during the sharing period" for "during the sharing period." For engineering-development and low-rate-initial-production solicitations and contracts, the contracting officer shall modify subdivision (i)(3)(i) and the first sentence under subparagraph (3) of the definition of acquisition savings by substituting for "the number of future contract units scheduled for delivery during the sharing period," "a number equal to the quantity required over the highest 36 consecutive months of planned production, based on planning or production documentation at the time the VECP is accepted."

VALUE ENGINEERING (MAR 1989)

(a) *General.* The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any net acquisition savings realized from accepted VECP's, in accordance with the incentive sharing rates in paragraph (f) below.

(b) *Definitions.* "Acquisition savings," as used in this clause, means savings resulting from the application of a VECP to contracts awarded by the same contracting office or its successor for essentially the same unit. Acquisition savings include—

(1) Instant contract savings, which are the net cost reductions on this, the instant contract, and which are equal to the instant unit cost reduction multiplied by the number of instant contract units affected by the VECP, less the Contractor's allowable development and implementation costs;

(2) Concurrent contract savings, which are net reductions in the prices of other contracts that are definitized and ongoing at the time the VECP is accepted; and

(3) Future contract savings, which are the product of the future unit cost reduction multiplied by the number of future contract units scheduled for delivery during the sharing period. If this contract is a multiyear contract, future contract savings include savings on quantities funded after VECP acceptance.

"Collateral costs," as used in this clause, means agency cost of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contracting office" includes any contracting office that the acquisition is transferred to, such as another branch of the agency or another agency's office that is performing a joint acquisition action.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Future unit cost reduction," as used in this clause, means the instant unit cost reduction adjusted as the Contracting Officer considers necessary for projected learning or changes in quantity during the sharing period. It is calculated at the time the VECP is accepted and applies either (1) throughout the sharing period, unless the Contracting Officer decides that recalculation is necessary because conditions are significantly different from those previously anticipated or (2) to the calculation of a lump-sum payment, which cannot later be revised.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistics support. The term does not include the normal administrative costs of processing the VECP or any increase in this contract's cost or price resulting from negative instant contract savings.

"Instant contract," as used in this clause, means this contract, under which the VECP is submitted. It does not include increases in quantities after acceptance of the VECP that are due to contract modifications, exercise of options, or additional orders. If this is a multiyear contract, the term does not include quantities funded after VECP acceptance. If this contract is a fixed-price contract with prospective price redetermination, the term refers to the period for which firm prices have been established.

"Instant unit cost reduction" means the amount of the decrease in unit cost of performance (without deducting any Contractor's development or implementation costs) resulting from using the VECP on this, the instant contract. If this is a service contract, the instant unit cost reduction is normally equal to the number of hours per line-item task saved by using the VECP on this contract, multiplied by the appropriate contract labor rate.

"Negative instant contract savings" means the increase in the cost or price of this contract when the acceptance of a VECP results in an excess of the Contractor's allowable development and implementation costs over the product of the instant unit cost reduction multiplied by the number of instant contract units affected.

"Net acquisition savings" means total acquisition savings, including instant, concurrent, and future contract savings, less Government costs.

"Sharing base," as used in this clause, means the number of affected end items on contracts of the contracting office accepting the VECP.

"Sharing period," as used in this clause, means the period beginning with acceptance of the first unit incorporating the VECP and ending at the later of (1) 3 years after the first unit affected by the VECP is accepted or (2) the last scheduled delivery date of an item affected by the VECP under this contract's delivery schedule in effect at the time the VECP is accepted.

"Unit," as used in this clause, means the item or task to which the Contracting Officer and the Contractor agree the VECP applies.

"Value engineering change proposal (VECP)" means a proposal that—

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the overall projected cost to

the agency without impairing essential functions or characteristics; *provided*, that it does not involve a change—

(i) In deliverable end item quantities only;

(ii) In research and development (R&D) end items or R&D test quantities that is due solely to results of previous testing under this contract; or

(iii) To the contract type only.

(c) *VECP preparation.* As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (8) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and the proposed requirement, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, the effect of the change on the end item's performance, and any pertinent objective test data.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) Identification of the unit to which the VECP applies.

(4) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under the Subcontracts paragraph of this clause, below.

(5) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(The next page is 52-281.)

(6) A prediction of any effects the proposed change would have on collateral costs to the agency.

(7) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(8) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) *Submission.* The Contractor shall submit VECP's to the Contracting Officer, unless this contract states otherwise. If this contract is administered by other than the contracting office, the Contractor shall submit a copy of the VECP simultaneously to the Contracting Officer and to the Administrative Contracting Officer.

(e) *Government action.* (1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause and made either before or within a reasonable time after contract performance is completed. Until such a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP and the decision as to which of the sharing rates applies shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) *Sharing rates.* If a VECP is accepted, the Contractor shall share in net acquisition savings according to the percentages shown in the table below. The percentage paid the Contractor depends upon (1) this contract's type (fixed-price, incentive, or cost-reimbursement), (2) the sharing arrangement specified in paragraph (a) above (incentive, program requirement, or a combination as delineated in the Schedule), and (3) the source of the savings (the instant contract, or concurrent and future contracts), as follows:

CONTRACTOR'S SHARE OF NET ACQUISITION SAVINGS
(figures in percent)

Contract Type	Sharing Arrangement			
	Incentive (voluntary)		Program requirement (mandatory)	
	Instant contract rate	Concurrent and future contract rate	Instant contract rate	Concurrent and future contract rate
Fixed-price (other than incentive)	50	50	25	25
Incentive (fixed-price or cost)	*	50	*	25
Cost-reimbursement (other than incentive)**	25	25	15	15

* Same sharing arrangement as the contract's profit or fee adjustment formula.
** Includes cost-plus-award-fee contracts.

(g) *Calculating net acquisition savings.* (1) Acquisition savings are realized when (i) the cost or price is reduced on the instant contract, (ii) reductions are negotiated in concurrent contracts, (iii) future contracts are awarded, or (iv) agreement is reached on a lump-sum payment for future contract savings (see subparagraph (i)(4) below). Net acquisition savings are first realized, and the Contractor shall be paid a share, when Government costs and any negative instant contract savings have been fully offset against acquisition savings.

(2) Except in incentive contracts, Government costs and any price or cost increases resulting from negative instant contract savings shall be offset against acquisition savings each time such savings are realized until they are fully offset. Then, the Contractor's share is calculated by multiplying net acquisition savings by the appropriate Contractor's percentage sharing rate (see paragraph (f) above). Additional Contractor shares of net acquisition savings shall be paid to the Contractor at the time realized.

(3) If this is an incentive contract, recovery of Government costs on the instant contract shall be deferred and offset against concurrent and future contract savings. The Contractor shall share through the contract incentive structure in savings on the instant contract items affected. Any negative instant contract savings shall be added to the target cost or to the target price and ceiling price, and the amount shall be offset against concurrent and future contract savings.

(4) If the Government does not receive and accept all items on which it paid the Contractor's share, the Contractor shall reimburse the Government for the proportionate share of these payments.

(h) *Contract adjustment.* The modification accepting the VECP (or a subsequent modification issued as soon as possible after any negotiations are completed) shall—

(1) Reduce the contract price or estimated cost by the amount of instant contract savings, unless this is an incentive contract;

(2) When the amount of instant contract savings is negative, increase the contract price, target price and ceiling price, target cost, or estimated cost by that amount;

(3) Specify the Contractor's dollar share per unit on future contracts, or provide the lump-sum payment;

(4) Specify the amount of any Government costs or negative instant contract savings to be offset in determining net acquisition savings realized from concurrent or future contract savings; and

(5) Provide the Contractor's share of any net acquisition savings under the instant contract in accordance with the following:

(i) Fixed-price contracts—add to contract price.

(ii) Cost-reimbursement contracts—add to contract fee.

(i) *Concurrent and future contract savings.* (1) Payments of the Contractor's share of concurrent and future contract savings shall be made by a modification to the instant contract in accordance with subparagraph (h)(5) above. For incentive contracts, shares shall be added as a separate firm-fixed-price line item on the instant contract. The Contractor shall maintain records adequate to identify the first delivered unit for 3 years after final payment under this contract.

(2) The Contracting Officer shall calculate the Contractor's share of concurrent contract savings by (i) subtracting from the reduction in price negotiated on the concurrent contract any Government costs or negative instant contract savings not yet offset and (ii) multiplying the result by the Contractor's sharing rate.

(3) The Contracting Officer shall calculate the Contractor's share of future contract savings by (i) multiplying the future unit cost reduction by the number of future contract units scheduled for delivery during the sharing period, (ii) subtracting any Government costs or negative instant contract savings not yet offset, and (iii) multiplying the result by the Contractor's sharing rate.

(4) When the Government wishes and the Contractor agrees, the Contractor's share of future contract savings may be paid in a single lump sum rather than in a series of payments over time as future contracts are awarded. Under this alternate procedure, the future contract savings may be calculated when the VECP is accepted, on the basis of the Contracting Officer's forecast of the number of units that will be delivered during the sharing period. The Contractor's share shall be included in a modification to this contract (see subparagraph (h)(3) above) and shall not be subject to subsequent adjustment.

(5) Alternate no-cost settlement method. When, in accordance with subsection 48.104-3 of the Federal Acquisition Regulation, the Government and the Contractor mutually agree to use the no-cost settlement method, the following applies:

(i) The Contractor will keep all the savings on the instant contract and on its concurrent contracts only.

(ii) The Government will keep all the savings resulting from concurrent contracts placed on other sources, savings from all future contracts, and all collateral savings.

(j) *Collateral savings.* If a VECP is accepted, the instant contract amount shall be increased, as specified in subparagraph (h)(5) above, by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings shall not exceed (1) the contract's firm-fixed-price, target price, target cost, or estimated cost, at the time the VECP is accepted, or (2) $100,000, whichever is greater. The Contracting Officer shall be the sole determiner of the amount of collateral savings, and that amount shall not be subject to the Disputes clause or otherwise subject to litigation under 41 U.S.C. 601-613.

(k) *Relationship to other incentives.* Only those benefits of an accepted VECP not rewardable under performance, design-to-cost (production unit cost, operating and support costs, reliability and maintainability), or similar incentives shall be rewarded under this clause. However, the targets of such incentives affected by the VECP shall not be adjusted because of VECP acceptance. If this contract specifies targets but provides no incentive to surpass them, the value engineering sharing shall apply only to the amount of achievement better than target.

(l) *Subcontracts.* The Contractor shall include an appropriate value engineering clause in any subcontract of $100,000 or more and may include one in subcontracts of lesser value. In calculating any adjustment in this contract's price for instant contract savings (or negative instant contract savings), the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs, and any value engineering incentive payments to a subcontractor, clearly resulting from a VECP accepted by the Government under this contract. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; *provided*, that the payments shall not reduce the Government's share of concurrent or future contract savings or collateral savings.

(m) *Data.* The Contractor may restrict the Government's

right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:
"These data, furnished under the Value Engineering clause of contract . . . . . , shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

Alternate I (APR 1984). If the contracting officer selects a mandatory value engineering program requirement, substitute the following paragraph (a) for paragraph (a) of the basic clause:

(a) *General.* The Contractor shall (1) engage in a value engineering program, and submit value engineering progress reports, as specified in the Schedule and (2) submit to the Contracting Officer any resulting value engineering change proposals (VECP's). In addition to being paid as the Schedule specifies for this mandatory program, the Contractor shall share in any net acquisition savings realized from accepted VECP's, in accordance with the program requirement sharing rates in paragraph (f) below.

(R 7-104.44(b) 1974 APR)

Alternate II (APR 1984). If the contracting officer selects *both* a value engineering incentive and mandatory value engineering program requirement, substitute the following paragraph (a) for paragraph (a) of the basic clause:

(a) *General.* For those contract line items designated in the Schedule as subject to the value engineering program requirement, the Contractor shall (1) engage in a value engineering program, and submit value engineering progress reports, as specified in the Schedule and (2) submit to the Contracting Officer any resulting VECP's. In addition to being paid as the Schedule specifies for this mandatory program, the Contractor shall share in any net acquisition savings realized from VECP's accepted under the program, in accordance with the program requirement sharing rates in paragraph (f) below. For remaining areas of the contract, the Contractor is encouraged to develop, prepare, and submit VECP's voluntarily; for VECP's accepted under these remaining areas, the incentive sharing rates apply.

(NM)

Alternate III (APR 1984). When the head of the contracting activity determines that the cost of calculating and tracking collateral savings will exceed the benefits to be derived in a contract calling for a value engineering incentive, delete paragraph (j) from the basic clause and redesignate the remaining paragraphs accordingly.

52.248-2 Value Engineering—Architect-Engineer.

As prescribed in 48.201(f), insert the following clause:

VALUE ENGINEERING—ARCHITECT-ENGINEER
(MAR 1990)

(a) *General.* The Contractor shall (1) perform value engineering (VE) services and submit progress reports as specified in the Schedule; and (2) submit to the Contracting Officer any resulting value engineering proposals (VEP's). Value engineering activities shall be performed concurrently with, and without delay to, the schedule set forth in the contract. The services shall include VE evaluation and review and study of design documents immediately following completion of the 35 percent design state or at such stages as the Contracting Officer may direct. Each separately priced line item for VE services shall define specifically the scope of work to be accomplished and may include VE studies of items other than design documents. The Contractor shall be paid as the contract specifies for this effort, but shall not share in savings which may result from acceptance and use of VEP's by the Government.

(b) *Definitions.* "Life cycle cost," as used in this clause, is the sum of all costs over the useful life of a building, system or product. It includes the cost of design, construction, acquisition, operation, maintenance, and salvage (resale) value, if any.

"Value engineering," as used in this clause, means an organized effort to analyze the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with required performance, reliability, quality, and safety.

"Value engineering proposal," as used in this clause, means, in connection with an A-E contract, a change proposal developed by employees of the Federal Government or ~~contractor's~~ value engineering personnel under contract to an agency to provide value engineering services for the contract or program.

(c) *Submissions.* After award of an architect-engineering contract the contractor shall—

(1) Provide the Government with a fee breakdown schedule for the VE services (such as criteria review, task team review, and bid package review) included in the contract schedule;

(2) Submit, for approval by the Contracting Officer, a list of team members and their respective resumes representing the engineering disciplines required to complete the study effort, and evidence of the team leader's qualifications and engineering discipline. Subsequent changes or substitutions to the approved VE team shall

be submitted in writing to the Contracting Officer for approval; and

(3) The team leader shall be responsible for pre-study work assembly and shall edit, reproduce, and sign the final report and each VEP. All VEP's, even if submitted earlier as an individual submission, shall be contained in the final report.

(d) *VEP preparation.* As a minimum, the contractor shall include the following information in each VEP:

(1) A description of the difference between the existing and proposed design, the comparative advantages and disadvantages of each, a justification when an item's function is being altered, the effect of the change on system or facility performance, and any pertinent objective test data.

(2) A list and analysis of design criteria or specifications that must be changed if the VEP is accepted.

(3) A separate detailed estimate of the impact on project cost of each VEP, if accepted and implemented by the Government.

(4) A description and estimate of costs the Government may incur in implementing the VEP, such as design change cost and test and evaluation cost.

(5) A prediction of any effects the proposed change may have on life cycle cost.

(6) The effect the VEP will have on design or construction schedules.

(e) *VEP acceptance.* Approved VEP's shall be implemented by bilateral modification to this contract.

(End of clause)

52.248-3 Value Engineering—Construction.

As prescribed in 48.202, insert the following clause:

VALUE ENGINEERING—CONSTRUCTION
(MAR 1989)

(a) *General.* The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) *Definitions.* "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that—

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; *provided*, that it does not involve a change—

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) *VECP preparation.* As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and

contract numbers involved, and previous Government actions, if known.

(d) *Submission.* The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) *Government action.* (1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) *Sharing.* (1) *Rates.* The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (i) 45 percent for fixed-price contracts or (ii) 75 percent for cost-reimbursement contracts.

(2) *Payment.* Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to—

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) *Collateral savings.* If a VECP is accepted, the instant contract amount shall be increased by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings shall not exceed (1) the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or (2) $100,000, whichever is greater. The Contracting Officer shall be the sole determiner of the amount of collateral savings, and that amount shall not be subject to the Disputes clause or otherwise subject to litigation under 41 U.S.C. 601-613.

(h) *Subcontracts.* The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; *provided,* that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) *Data.* The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering—Construction clause of contract . . . . . , shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

Alternate I (APR 1984). When the head of the contracting activity determines that the cost of calculating and tracking collateral savings will exceed the benefits to be derived in a construction contract, delete paragraph (g) from the basic clause and redesignate the remaining paragraphs accordingly.

52.249-1 Termination for Convenience of the Government (Fixed-Price) (Short Form).

As prescribed in 49.502(a)(1), insert the following clause in solicitations and contracts when a fixed-price contract is contemplated and the contract amount is expected to be $100,000 or less, except (a) if use of the clause at 52.249-4, Termination for Convenience of the Government

PART 1448 -- VALUE ENGINEERING

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PART 1448 -- VALUE ENGINEERING

Subpart 1448.1 -- Policies and Procedures

1448.102 Policies.

(a) The Director, Office of Acquisition and Property Management, is authorized to make the determination to extend the sharing base of a value engineering change proposal (VECP) as prescribed in FAR 48.102(e).

(b) The head of the contracting activity is authorized to extend the sharing base of a VECP to include the entire contracting activity or any part of it (see FAR 48.102(e)).

(c) Requests for determinations under (a) above shall be submitted by the head of the contracting activity.

(d) When the sharing base is extended under (a) or (b) above, the contracting officer shall specify the base in the contract schedule as required in FAR 48.104-1(a).

1448.103 Processing value engineering change proposals.

The head of the contracting activity shall establish procedures for processing and evaluating VECPs as prescribed in FAR 48.103.

PART WBR 1448

VALUE ENGINEERING

SUBPART WBR 1448.1 – POLICIES AND PROCEDURES

WBR 1448.102 Policies.

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PART 1448 - VALUE ENGINEERING

Subpart 1448.1 -- Policies and Procedures

1448.102 Policies.

(a) The Director, Office of Acquisition and Property Management, is authorized to make the determination to extend the sharing base of a value engineering change proposal (VECP) as prescribed in FAR 48.102(e).

(b) The head of the contracting activity is authorized to extend the sharing base of a VECP to include the entire contracting activity or any part of it (see FAR 48.102(e)).

(c) Requests for determinations under (a) above shall be submitted by the head of the contracting activity.

(d) When the sharing base is extended under (a) or (b) above, the contracting officer shall specify the base in the contract schedule as required in FAR 48.104-1(a).

1448.103 Processing value engineering change proposals.

The head of the contracting activity shall establish procedures for processing and evaluating VECPs as prescribed in FAR 48.103.

DEPARTMENTAL MANUAL

TRANSMITTAL SHEET

PART	SUBJECT	RELEASE NUMBER
369 DM 1	MANAGEMENT SYSTEMS AND PROCEDURES	2931
FOR FURTHER INFORMATION, CONTACT Office of Construction Management	Value Engineering and Analysis General Criteria and Policy	DATE JAN 8 1992

EXPLANATION OF MATERIAL TRANSMITTED:

This Departmental Manual release, 369 DM 1, implements Office of Management and Budget (OMB) Circular A-131, Value Engineering; and establishes policy, assigns responsibilities, and defines objectives, goals, and actions required to establish and maintain a productive value engineering program.

Assistant Secretary of the Interior

FILING INSTRUCTIONS:

Remove:	Insert:
None	369 DM 1 (4 sheets)

1.1 Purpose. This part implements Office of Management and Budget (OMB) Circular No. A-131, Value Engineering, dated January 26, 1988. It establishes policy, assigns responsibilities, and defines objectives, goals, and actions required to establish and maintain a productive value engineering (VE) and value analysis program.

1.2 Scope. The VE program is a mandatory program that applies to all Department of the Interior (DOI) bureaus/offices which perform or contract for the design, construction, repair and rehabilitation/renovation of facilities. Additional administrative and management programs will be considered in the VE program in the future. Bureaus/Offices which administer grant programs involving construction, repair and rehabilitation of facilities shall encourage grantees to implement value engineering wherever possible. All bureaus/offices having contractual authority for procurement and/or construction will implement contractor Value Engineering Change Proposal (VECP) programs in accordance with references 1.3B, 1.3C, 1.3D, and 1.3E.

1.3 References.

A. OMB Circular No. A-131, Value Engineering

B. Federal Acquisition Regulation (FAR), Title 48, Part 48 (Value Engineering), and value engineering clauses in Part 52

C. FAR, Title 48, Part 31, Contract Cost Principles and Procedures

D. Title 43, (Public Lands: Interior), Part 12, Subpart C, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments

E. Department of the Interior Acquisition Regulation (DIAR), Part 48, Value Engineering

F. DOI Value Engineering Guidance Handbook (Copies of this Handbook may be obtained from the Office of Construction Management.)

1.4 Definitions.

A. Administration and Management Programs include all organizations and personnel which manage and perform tasks to meet the missions of the various bureaus/offices within DOI.

They include administration, supervision, labor, procurement, operations and maintenance, and similar activities needed to produce the products and services required by customers.

B. Certified Value Specialist (CVS) is a designation recognizing those practitioners who have fulfilled the certification requirements as established by the CVS Board of the Society of American Value Engineers (SAVE), reflecting world-wide expectations of a professional Value Engineer.

C. Construction program includes design, building, alteration of or repair of buildings, structures, or other real property, and includes all preparatory conceptual design activities. The term includes, but is not limited to, buildings, structures, pavement, fences, dams, canals, sewers, mains, power lines, bridges, hatcheries, and installation of fixed equipment.

D. Life Cycle Cost (LCC) is the sum of all acquisition, operation, maintenance, replacement, use and disposal costs for a project or product over a specified period of time. Economic analysis is used in performing LCC.

E. Return on Investment (ROI) is determined by dividing the cost of performing the value engineering function into the savings generated by the function.

F. Value (V) is the quotient of Cost (C) divided by Worth (W). When cost exceeds worth, poor value occurs. When cost is less than worth, good value exists. Worth is the lowest LCC to fully satisfy the function being studied.

G. Value Engineering (VE) is an organized team study of functions to creatively generate alternatives which will satisfy the user's needs at the lowest LCC. It will not sacrifice performance, reliability, quality, maintainability or safety.

H. Value Engineering Change Proposal (VECP) is a change submitted by a contractor pursuant to a contract provision for the purpose of reducing the contract price and sharing in the savings. Contract clauses are described at FAR 52.248-1, 52.248-2, and 52.248-3.

I. Value Engineering Proposal (VEP) is a recommendation resulting from using VE methodology to study an item. It is developed by in-house employees or outside personnel contracted to perform a VE study.

J. Value Engineering Program Coordinator (VEPC) manages the VE program at the bureau/office level.

K. Value Engineering Program Manager (VEPM) manages the VE program in the Office of the Secretary, Office of Construction Management (PCM).

L. Value Engineering Review Board (VERB) is composed of those individuals who head organizations which are primary recipients of VE goals. The VERB must have decision-making authority that allows immediate action to be taken on each VE study presented before it.

1.5 Policy.

A. All Department of the Interior (DOI) bureaus/offices shall establish value engineering programs, consistent with the level of construction and repair and rehabilitation of facilities supported by the bureaus/offices, as specified in 369 DM 1.2; ensure their continual support with necessary funding and staff, utilize the DOI VE Guidance Handbook, and maintain constant management support.

B. VE will be actively applied in all phases of projects and programs. Review of VE recommendations will be prompt and objective with the intent to implement them to the maximum extent possible. Results will be documented by the bureau/office VEPC and reported to PCM-VEPM through bureau/office heads.

C. Responsibility and authority for the value engineering program are assigned to each of the five program Assistant Secretaries. Goals, responsibility and authority will be suballocated to bureau/office heads and the VE program managers. Meeting VE goals shall be a critical element in the performance appraisals of bureau/office heads or appropriate managers responsible for the mandatory VE program.

1.6 Objectives. Value engineering objectives are to:

A. Increase productivity, innovation, communication, personal growth and teamwork within the total organization through the use of VE principles, methodology and management.

B. Reduce costs to bureaus/offices while maintaining quality in fulfilling their missions by performing VE studies, promoting contractor VECPs and implementing VE recommendations.

C. Encourage the application of VE to grants as a way to provide additional program benefits for the same funding amount.

1.7 Goals.

A. All bureaus/offices with mandatory VE program responsibility, as set forth in 369 DM 1.2, shall set as an annual fiscal year (FY) cost savings goal, the amount equal to four (4) percent of the aggregate value of all construction, repair, rehabilitation, and renovation projects that are over $500,000 in estimated project costs. Projects between $500,000 and $1,000,000 may be excluded from VE analysis if it is determined that estimated VE savings do not economically justify study and redesign costs. Justification for VE analysis exclusion shall be reported to the VEPM. All projects over $1,000,000 shall be subjected to VE study. Regarding those projects requiring several years to construct, the savings may be prorated over the construction period to spread the goals properly. Bureaus/Offices will use value engineering studies and contractor generated proposals to meet the goal. The 4 percent goal will be evaluated after three years to determine if it should be adjusted. In addition, each bureau/office shall have a goal to encourage contractor participation in the VECP program sufficiently to produce one VECP for every contract over one million dollars ($1,000,000) that they administer.

B. Subject to the project's appropriation language, money saved from value engineering efforts may remain with the bureau/office to be used within discretionary authority as follows:

(1) Fund the underfunded or unfunded elements of the program/project/activity (PPA) where the VE savings accrued;

(2) Fund other VE programs within that PPA;

(3) Fund underfunded or unfunded elements of another PPA through a reprogramming action;

(4) Fund other VE programs of another PPA through a reprogramming action; or

(5) Return surplus savings to U.S. Treasury.

Note: A program/project/activity (PPA) is any item specifically identified in tables or written material set forth in the Interior and Related Agencies Appropriations Act or accompanying reports.

1.8 Procedures.

A. Bureau/Office heads will prepare and implement a VE Plan of Action in a format similar to that in Section B of the DOI

Value Engineering Guidance Handbook. Bureau/Office heads which administer construction grant programs will prepare and implement a VE Plan of Action for promoting and encouraging value engineering and identify specific grant projects which will employ value engineering techniques. The VE Plan of Action will be submitted to the Office of Construction Management-Value Engineering Program Manager (PCM-VEPM) by August 15 each year. The Plan will be reviewed and returned to the Bureau/Office with comments by September 1 each year. The final Plan will be reissued and signed by the bureau/office head and PCM-VEPM by October 1 each year.

B. VE Program Coordinators will ensure value activities are pursued below the $500,000 threshold whenever poor value is identified by the use of cost/worth determinations. Projects should be examined for unnecessary costs by people trained in VE. Studies will be performed if the Return on Investment (ROI) promises savings of 5 to 1 over study and redesign costs; if the project is over budget; or if requested by management. Studies will be performed at a project stage when concept and estimated costs are sufficiently detailed for comparison of alternatives. VE will be performed at any phase of a project cycle to correct poor value.

C. Architect-Engineer (A-E) design contracts shall stipulate an outside VE study may be performed on the design, preferably at the 25-40 percent design completion stage. Sufficient time should be scheduled to appraise the VE study and redirect design efforts, if necessary, before final design begins. Conduct VE studies by in-house personnel or by A-E firms with fully qualified VE capabilities and total independence of the design firm. VE actions that change approved design and procedures must include review by the authorities who approved the original design or procedures. The ultimate approval authority rests with the Value Engineering Review Board (VERB).

D. Value engineering costs will be accounted for as productive or nonproductive VE effort. Such costs will be deducted from gross VE cost reductions to show net return. In all programming and budgeting activities, project costs will be reduced from adopted (productive) VE proposals, only to the extent of the net cost savings after offsetting the cost of VE effort. VE costs include those for redesign resulting from VE studies. All VE costs will be identified in a manner to monitor program effectiveness. Funds for VE programs shall be included in the annual budget requests.

E. Value Engineering Program Coordinators will accumulate, consolidate and forward the original copy of the statistical summary of VE activities to OCM-VEPM, Washington, DC, in the format shown at the end of Section B of the DOI Value Engineering Guidance Handbook. Reports will be submitted to reach OCM-VEPM within 30 days after the end of each half of the Fiscal Year (FY). Additional reports will be requested as the need arises.

1.9 Responsibilities.

A. The Office of Construction Management (PCM) will:

(1) Oversee the entire DOI VE program; formulate, establish and maintain DOI policy on VE; establish goals; measure progress against the goals; evaluate program effectiveness; and submit reports required by OMB, the Congress, and others.

(2) Review Plans of Action, staffing and funding to assure VE programs are being fully supported and utilized. Advise Assistant Secretaries and Bureau/Office heads of deficiencies and recommend corrective actions.

(3) Designate a full-time VE Program Manager (VEPM), and support staff as required, to develop and manage the DOI VE Program. The VEPM will serve as the point of contact on Value Engineering and Value Analysis matters for all elements within DOI and other agencies or elements interfacing with DOI.

(4) Report to OMB on VE Program goals and accomplishments as required by OMB Circular No. A-131. Establish report formats and schedules to be prepared and submitted by DOI elements.

(5) Promote a high level of professional VE competence within DOI. Advise selection committees on qualifications needed for key VE personnel. Establish and chair meetings with bureau/office VE Program Coordinators, at least annually.

(6) Utilize a crossfeed system and ensure it provides ideas and VE program information to all VE Program Coordinators. Coordinate, consolidate and schedule VE training programs for all bureaus/offices.

B. Program Assistant Secretaries are responsible for VE program efficiency and productivity in all bureaus/offices within their jurisdiction. The Assistant Secretaries will:

(1) Demonstrate support for the VE program to ensure management adopts total commitment for the program.

(2) Establish a position to be filled by a qualified Value Engineering Program Coordinator (VEPC) for each bureau/office with mandatory VE program responsibility. A part-time position is allowed for the first two years of the program while it is developed, but a full-time position is strongly recommended after the second year for those bureaus/offices that have an annual in-house and/or contract construction program budget greater than $20 million.

C. Bureau/Office heads will:

(1) Assign all resources and staffing necessary to establish and maintain a VE program that fully complies with the requirements of this manual.

(2) Ensure a VE organizational and management structure that supports a long-term program. Budget sufficient funds to pay for all VE activities, including staff, VE studies done both in-house and by Architect-Engineering (A-E) firms under contract, VECP processing, VE related technical assistance, review of VE proposals, redesign to incorporate accepted recommendations, training and incidental costs such as testing, travel and professional activities related to VE.

(3) Direct that a Plan of Action is prepared each year by elements receiving VE goals for review by PCM-VEPM and the bureau's Assistant Secretary and direct corrective actions in plan execution when advised of inadequacies by PCM-VEPM.

(4) Establish a Value Engineering Review Board (VERB) within bureaus/offices with mandatory VE program responsibility to advise the VEPC, make recommendations on VE study presentations and assist in implementing recommendations.

D. Bureau/Office VE Program Coordinators (VECP) will maintain an active and effective VE program conforming to the requirements of this manual, the DOI VE Guidance Handbook, the FAR and DIAR; monitor all VE activities; develop and assemble Plans of Action and reports; coordinate and maintain a VE training program; evaluate program effectiveness and recommend remedial or improvement actions to the bureau/office head.

SECTION H - Blank Value Engineering/Analysis Forms

Blank Value Engineering/Analysis forms are provided to assist DOI personnel and contractors in conducting Value Engineering studies.

VALUE ENGINEERING PROPOSAL

STUDY NUMBER _____

PROJECT _____

LOCATION _____

TEAM MEMBERS

_____

_____

_____

_____

_____

_____

_____

CONSULTANTS

_____

_____

_____

_____

_____

_____

VE SIGNATURE: _____

DATE: _____

INFORMATION

ITEM UNDER STUDY _____

BASIC FUNCTION(S) _____ _____

FUNCTION(S) BEING ANALYZED _____ _____

SPECIAL CRITERIA

USER'S:

CODES:

RESTRICTIONS:

DESIGN HISTORY: (RESPONSIBILITIES, COMMITMENTS, STATUS, ETC.)

SPECULATION PHASE - APPLIED CREATIVITY TO GENERATE ALTERNATIVES

FUNCTION BEING ANALYZED: _____

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

4.

15.

16.

17.

18.

19.

20.

21.

22.

23.

24.

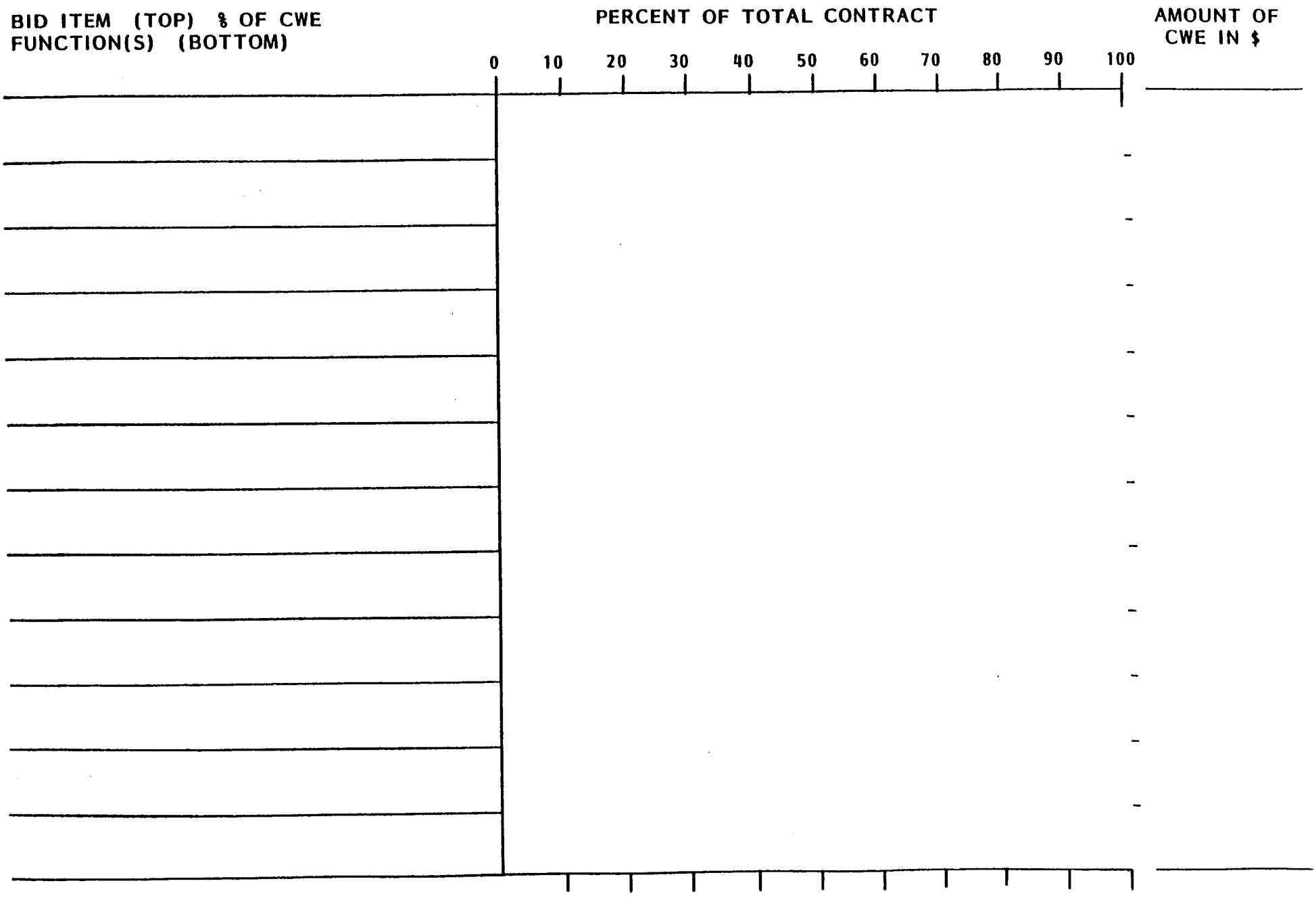
25.

HOW? →

← WHY?

FAST DIAGRAM AND COST MODEL

PROJECT: _____ STUDY ITEM: _____



COST MODEL

FUNCTION ANALYSIS

PROJECT: _____ STUDY ITEM: _____

COMPONENT	FUNCTION		*B/2nd	QTY.	UNIT	$\frac{\text{*COST}}{\text{WORTH}} = V$	DISCUSSION
	VERB	NOUN					

*B = Basic 2nd = Secondary

COST: From estimate

$\frac{C}{W} > 1$ = Poor Value

WORTH: Lowest known cost to satisfactorily achieve the function.

$\frac{C}{W} < 1$ = Good Value

Poor value items should be studied.

Functions for speculation: _____ _____ _____ _____ _____

NOTES:

VALUE ENGINEERING PROPOSAL

PROJECT _____ ITEM _____

ORIGINAL CONCEPT	VE CONCEPT

COSTS	INSTANT*	LIFE CYCLE*
ORIGINAL CONCEPT		
VE CONCEPT (–)		
SAVINGS		
NUMBER OF UNITS (X)		
TOTAL SAVINGS		
VE STUDY COSTS (–)		
IMPLEMENTATION COSTS (–)		
NET SAVINGS		

*CHOOSE ONE. USE INSTANT IF LCC DOES NOT APPLY.

LIFE-CYCLE COST ANALYSIS
Using Present Worth Costs

Item: _____
Life-Cycle Period: _____
Date: _____ Interest Rate: _____

		ORIGINAL		ALTERNATE NO. 1		ALTERNATE NO. 2	
		Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth
COLLATERAL / INITIAL COSTS	Base Cost						
	Interface Costs						
	a. _____						
	b. _____						
	c. _____						
	Other Initial Costs						
	a. _____						
	b. _____						
	Total Initial Cost Impact (IC)						
SALVAGE & REPLACEMENT COSTS	Single Expenditures @ _____ Interest						
	1. Year _____ PW Factor _____						
	2. Year _____ PW Factor _____						
	3. Year _____ PW Factor _____						
	4. Year _____ PW Factor _____						
	5. Year _____ PW Factor _____						
	Salvage _____ PW Factor _____						
	Total Present Worth						
ANNUAL COSTS	Annual Costs @ _____ Interest						
	a. Maintenance Escal. Rate_____ PWA Factor _____						
	b. Operations Escal. Rate_____ PWA Factor _____						
	c. Others Escal. Rate_____ PWA Factor _____						
	d. Others Escal. Rate_____ PWA Factor _____						
	Total Annual Costs						
	Total Present Worth Costs						
	Life Cycle (PW) Savings						

PW - Present Worth PWA - Present Worth of Annuity

ANALYSIS MATRIX — GENERIC CRITERIA

VE STUDY NO: _____

SUBJECT: _____ FUNCTION(S) _____ _____

COMPONENT OF: _____

FUNCTION FOR STUDY: _____ $\frac{\text{COST}}{\text{WORTH}}$ = _____

DISCUSSION: _____

_____

_____

DESIRED CRITERIA

FUNCTION FOR STUDY:		PERFORMS THE FUNCTION	FIRST RANKING	RELIABILITY	LOW FIRST COST	LOW OPERATIONS COST (ENERGY, LABOR, ETC.)	COST/EASE OF MAINTENANCE, REPAIR & REPLACEMENT	SIMPLE TO CONSTRUCT OR ASSEMBLE	ENVIRONMENTALLY/ ~~ETHETICALLY~~ DESIRABLE	TOTAL	FINAL RANKING
ALTERNATIVES	RELATIVE WEIGHTS	10		9	9	8	8	7	6		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

EXCELLENT – 5 VERY GOOD – 4 GOOD – 3 FAIR – 2 POOR – 1

ANALYSIS MATRIX VE STUDY NO: _____

SUBJECT: _____ FUNCTION: _____ _____

COMPONENT OF: _____

$\frac{\text{COST}}{\text{WORTH}} = \frac{\$}{\$}$ _____ DISCUSSION: _____

DESIRED CRITERIA

FUNCTION FOR STUDY:													
ALTERNATIVES	RELATIVE WEIGHTS		FIRST RANKING									TOTAL	FINAL RANKING
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													

EXCELLENT-5 VERY GOOD-4 GOOD-3 FAIR-2 POOR-1

ALTERNATIVE EVALUATION

PROJECT _____ STUDY ITEM _____

FUNCTION BEING ANALYZED _____

NO.	SELECTED ALTERNATIVES	ADVANTAGES	DISADVANTAGES	IDEA RATING

COST ESTIMATE FORM

PROJECT ______________________ SHEET ______ OF ______ DATE ______

LOCATION ______________________ ESTIMATED BY ______________________

COMMENTS

ITEM	QTY.	UNIT COST		TOTAL COST	
		Labor	Materials	Labor	Materials

CRITERIA WEIGHING PROCESS

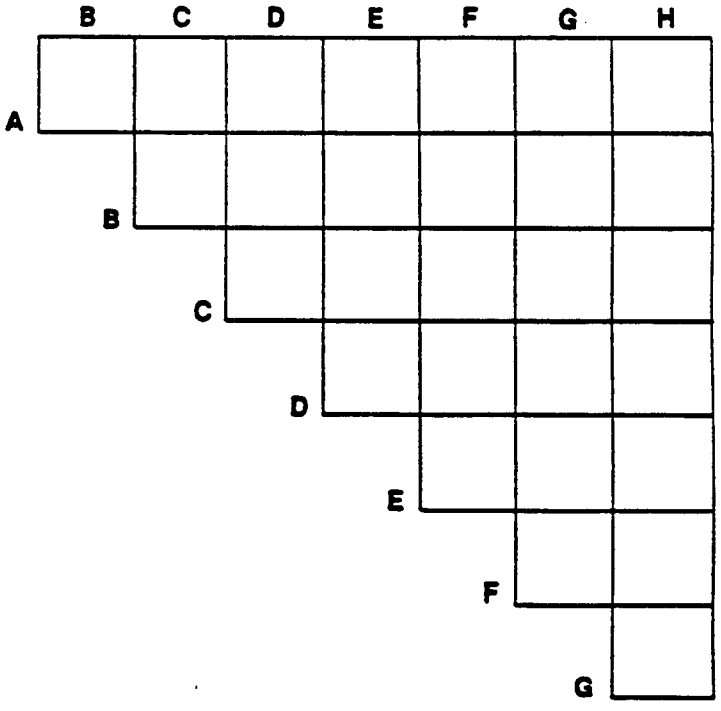
PROJECT _____ ITEM _____

FUNCTION BEING ANALYZED _____

CRITERIA	RAW SCORE	RANKING OF CRITERIA
A.		
B.		
C.		
D.		
E.		
F.		
G.		
H.		

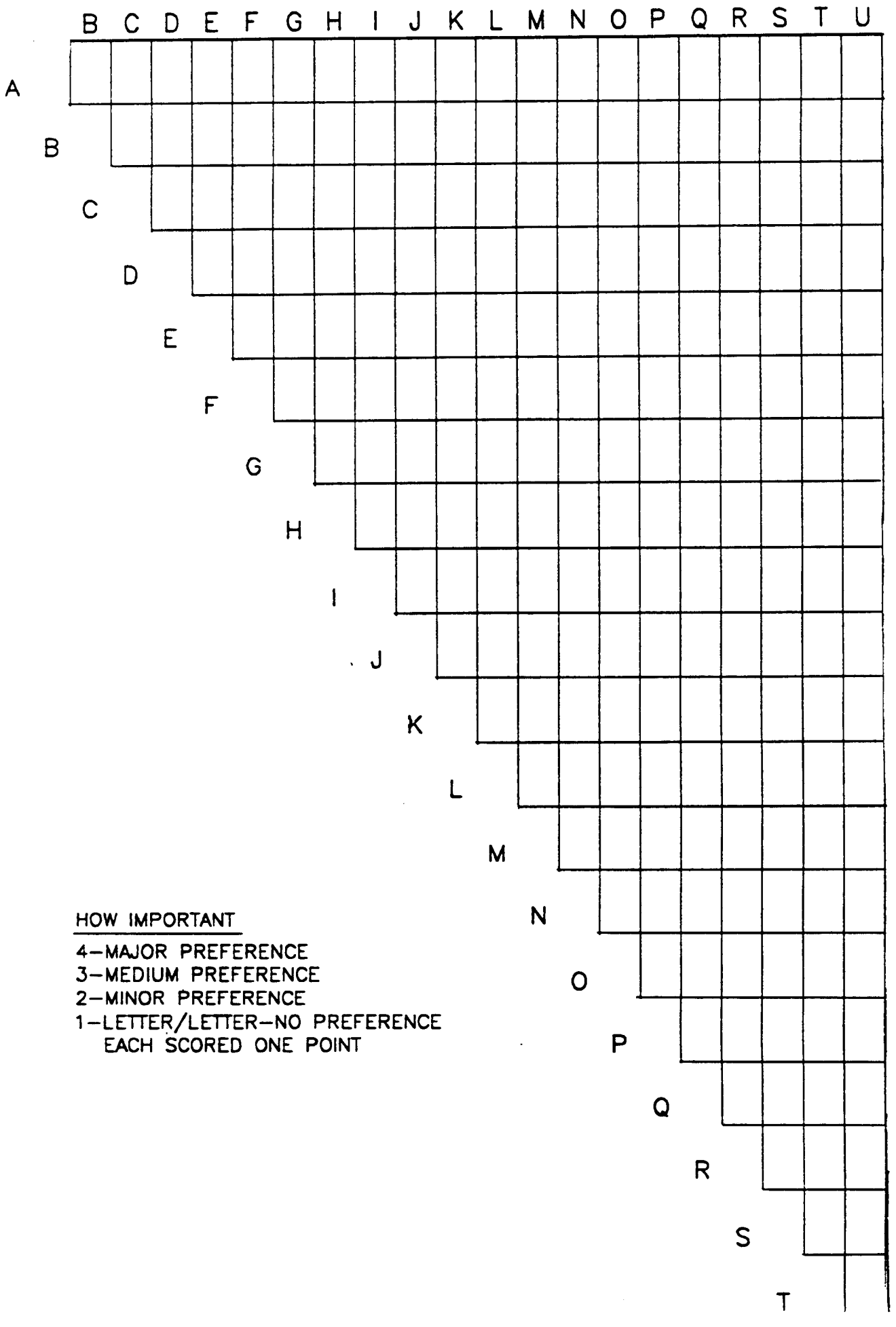
How Important

4–Major preference
3–Medium preference
2–Minor preference
1–Letter/Letter–No preference, each scored one point



NOTE: DROP CRITERIA WITH A RAW SCORE OF 2 OR LESS

CRITERIA WEIGHING PROCESS



HOW IMPORTANT

4—MAJOR PREFERENCE
3—MEDIUM PREFERENCE
2—MINOR PREFERENCE
1—LETTER/LETTER—NO PREFERENCE
EACH SCORED ONE POINT

ADDITIONAL ITEMS FOR STUDY

LISTING OF AREAS WITH POTENTIAL FOR IMPROVEMENT

DESCRIPTION	ESTIMATE OF DOLLARS INVOLVED	REMARKS

IMPLEMENTATION

1. CRITICAL ITEMS: (SCHEDULES, WEATHER, MATERIALS, FINANCING, ETC.)

2. PROBLEMS AND HOW THEY SHOULD BE OVERCOME. (PERSONNEL SHORTAGE = OVERTIME.) (CRITICAL MATERIAL = PROVEN SUBSTITUTES, ETC.)

3. PROCEDURES (WHO DOES WHAT)

4. SUMMATION OF BENEFITS VS. DRAWBACKS.